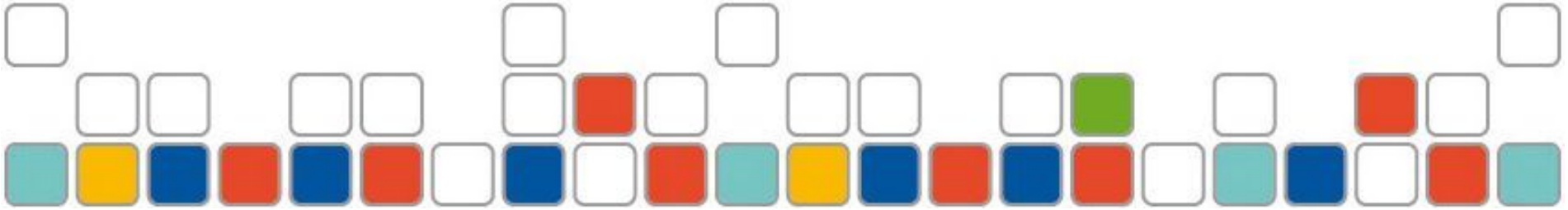
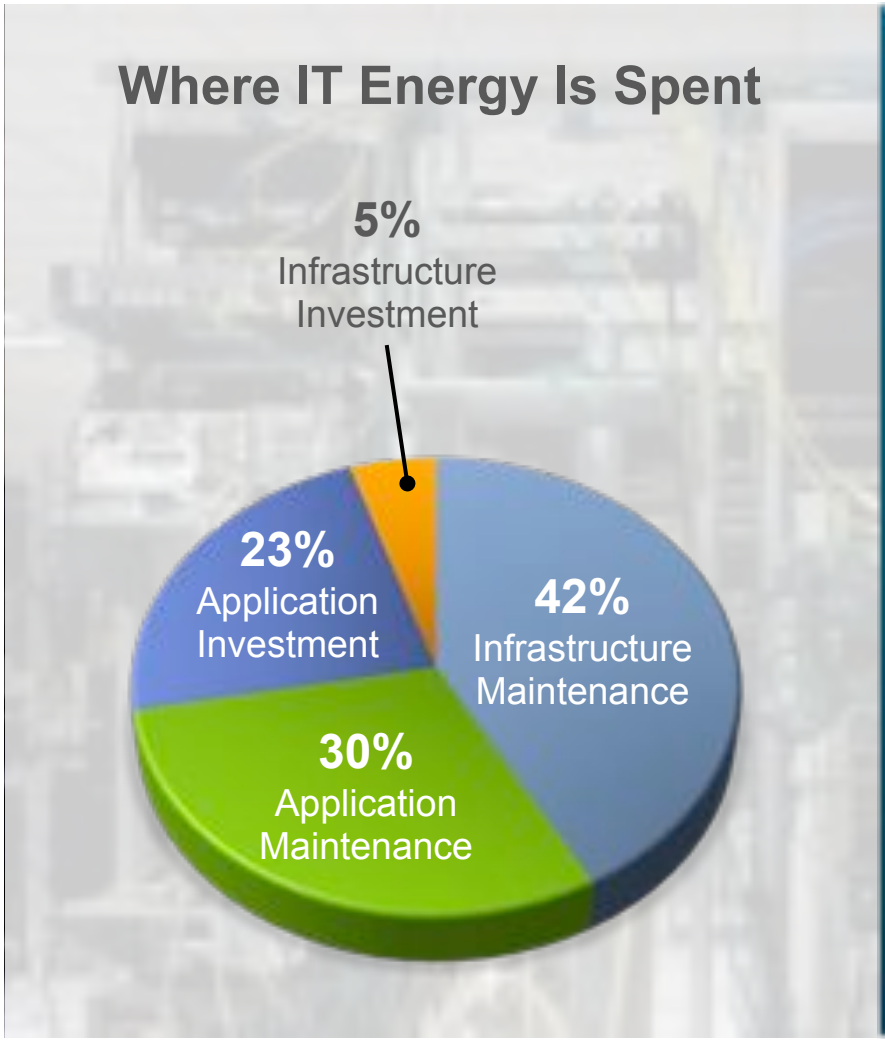


vmware® vSphere™ 4:

The Evolution of the IT Revolution

The Problem – *Complex, Inefficient, Inflexible*



Cause

- Overwhelming complexity
- Reliance on brittle infrastructure

Effect

- >70% of IT budgets just "maintaining" status quo
- <30% of IT budgets goes to innovation and competitive advantage

Business Agility Depends on IT Agility

Source: VMware Fortune 100 Customers

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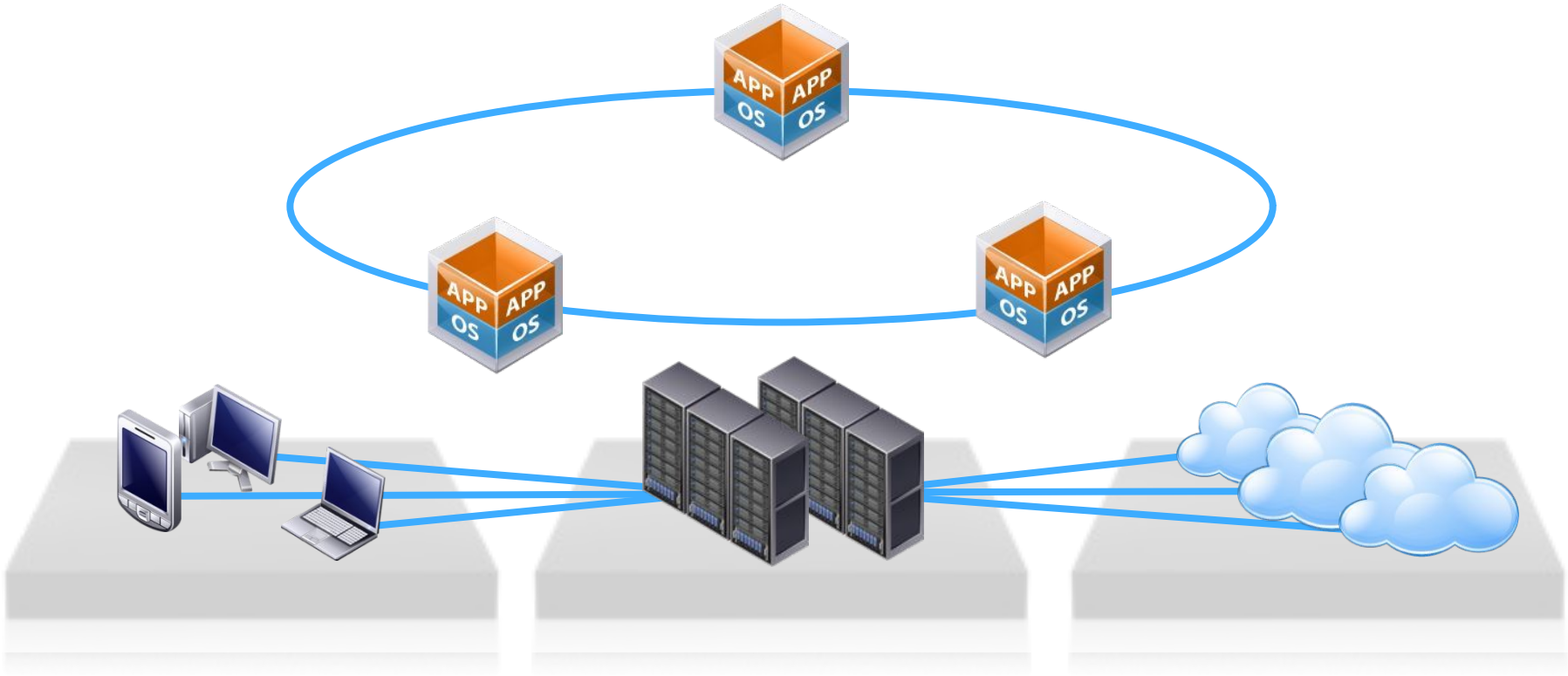
The Solution – *Business Infrastructure Virtualization*

Virtualizing all IT assets – from the desktop through the datacenter to the cloud – using a common virtualization platform, to create a dynamic, flexible infrastructure for the business



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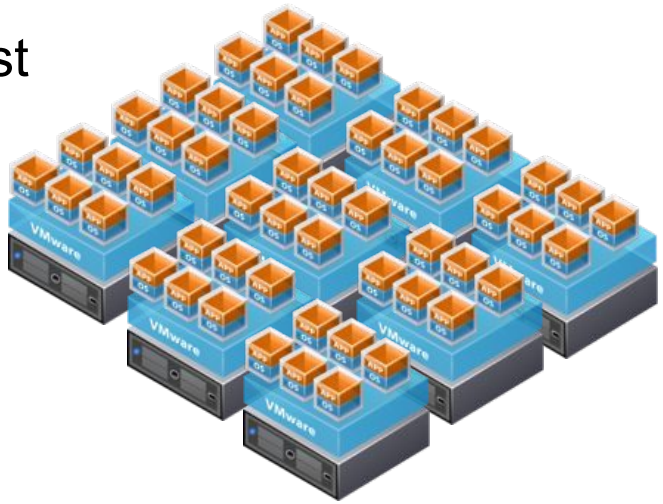
Virtualization Overview

- Hypervisor
  - Partitions computing resources of a server for multiple VMs
  - Hypervisors alone lack coordination for higher availability and efficiency

- VMware vSphere
  - VMware vSphere goes beyond basic host partitioning by aggregating infrastructure resources into a giant virtual computer
  - Serves as a dynamic OS for a private internal cloud in your datacenter



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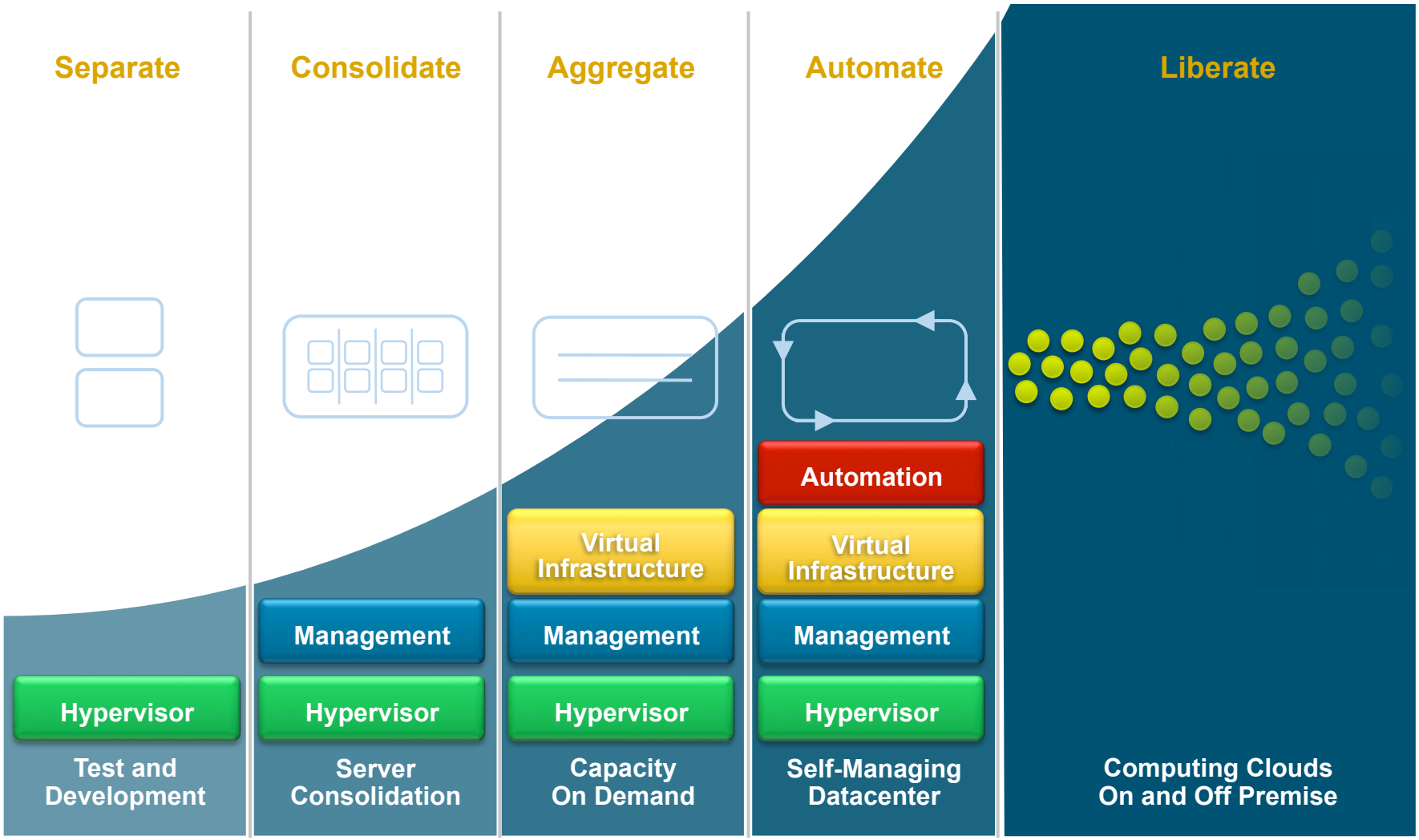
Virtualization Evolution Path



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Benefits of virtualization

Capex Savings

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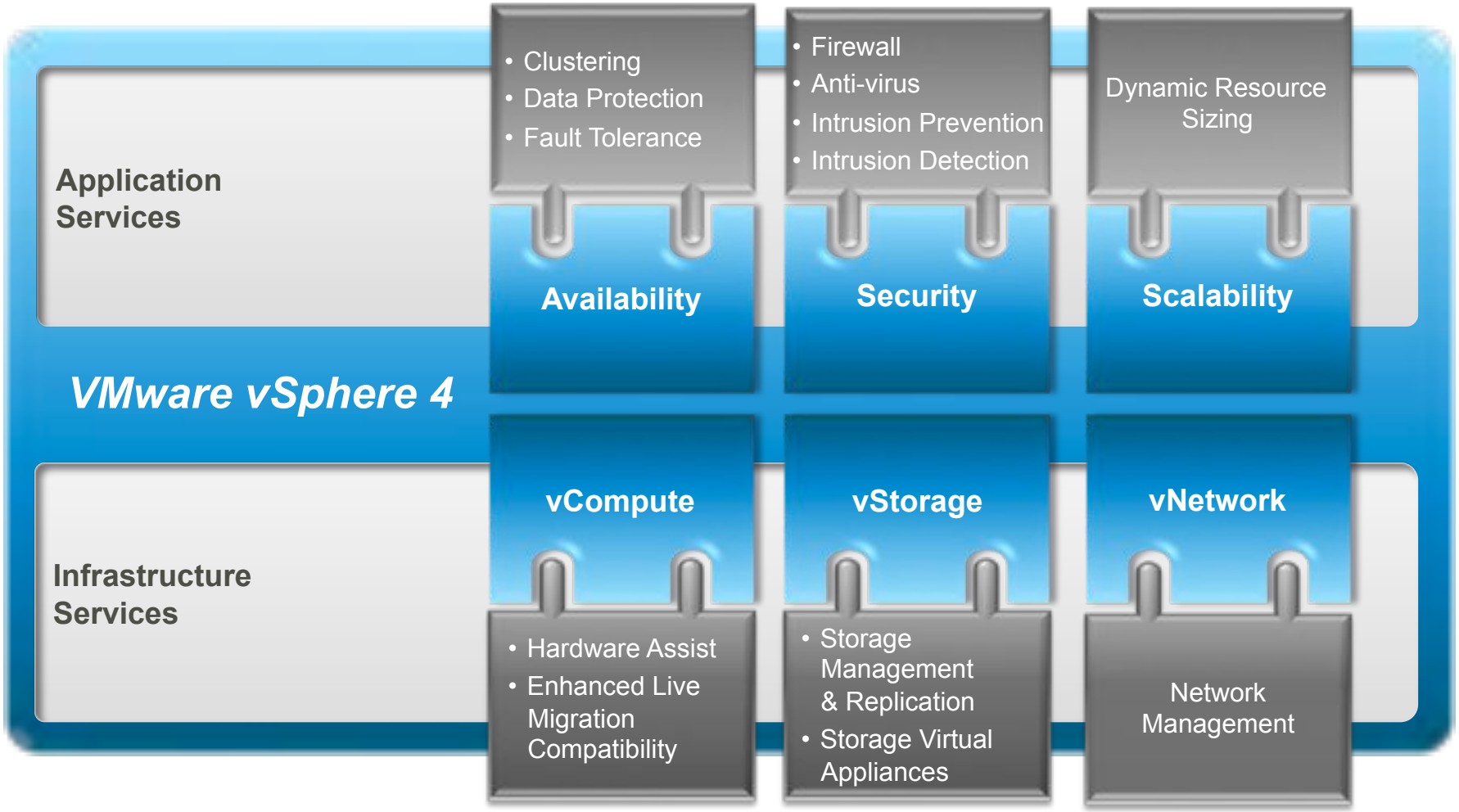
vSphere 4

Detailed Features

vSphere 4.0 – *The Most Complete Virtualization Platform*



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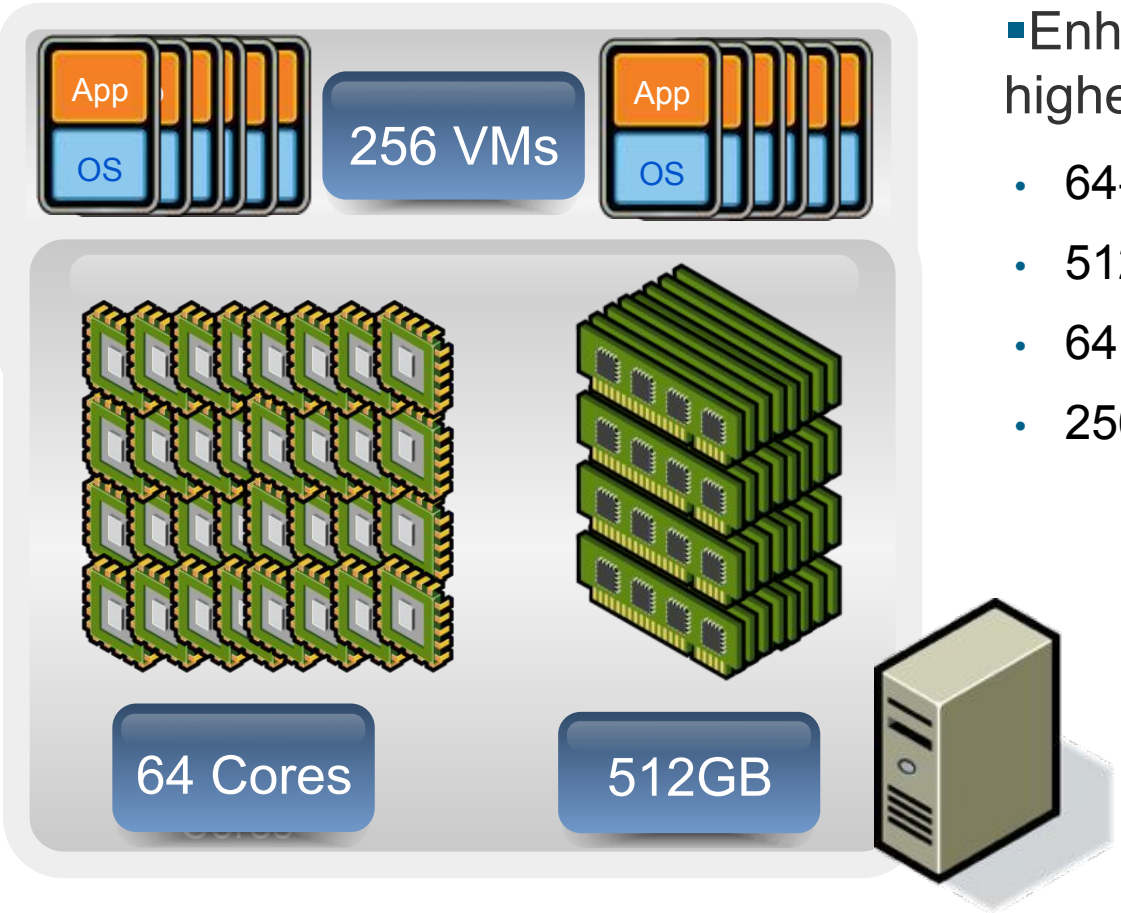
ESX 4 - Host Scalability



- Enhanced performance and higher consolidation rates
  - 64-bit VMkernel
  - 512GB host memory
  - 64 logical CPUs
  - 256 virtual machines per host

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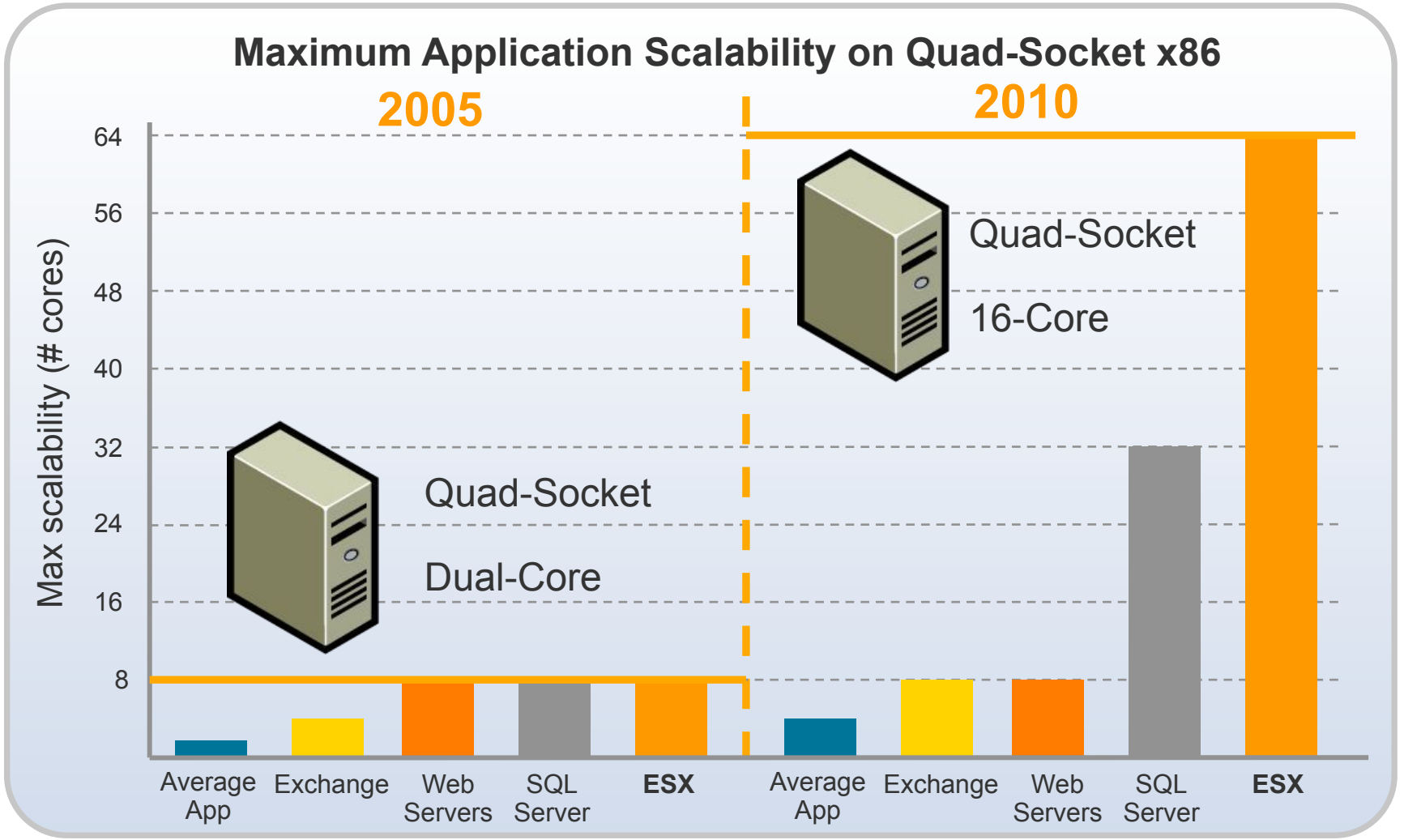
Scale Out with vSphere to Exceed Native Performance



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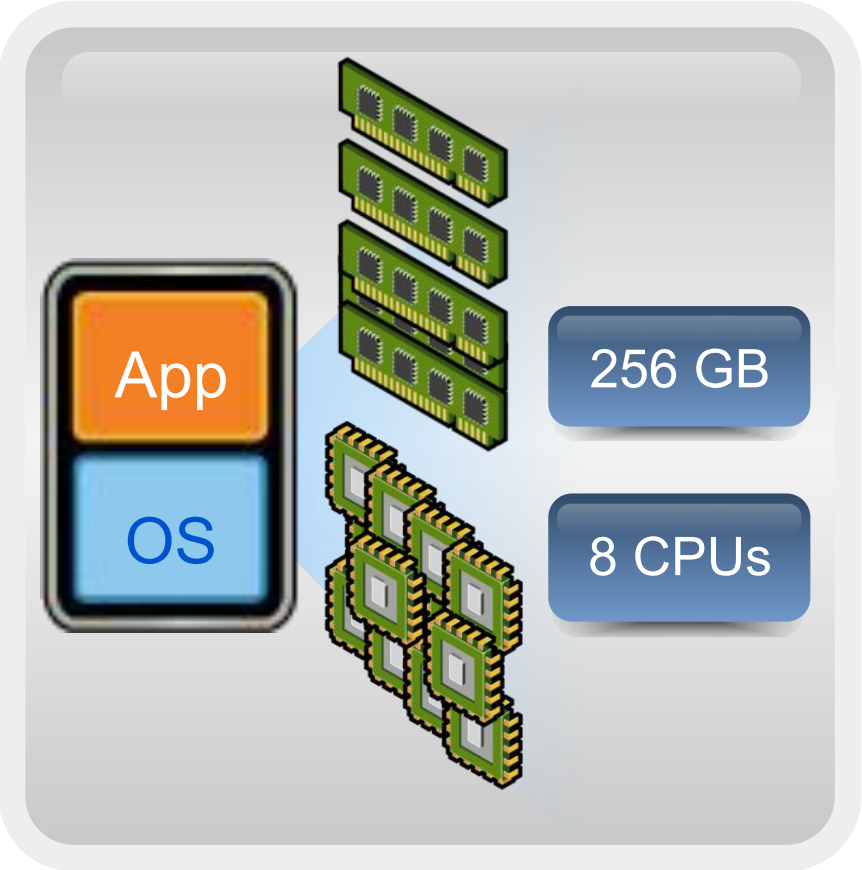
Virtual Machine Scalability



- Dynamic scale-up supports much larger workloads
  - 8-Way Virtual SMP
  - 256 GB RAM
  - New virtual hardware (Hardware v7)
    - New virtual devices
    - VMDirectPath I/O
    - Hot plug support

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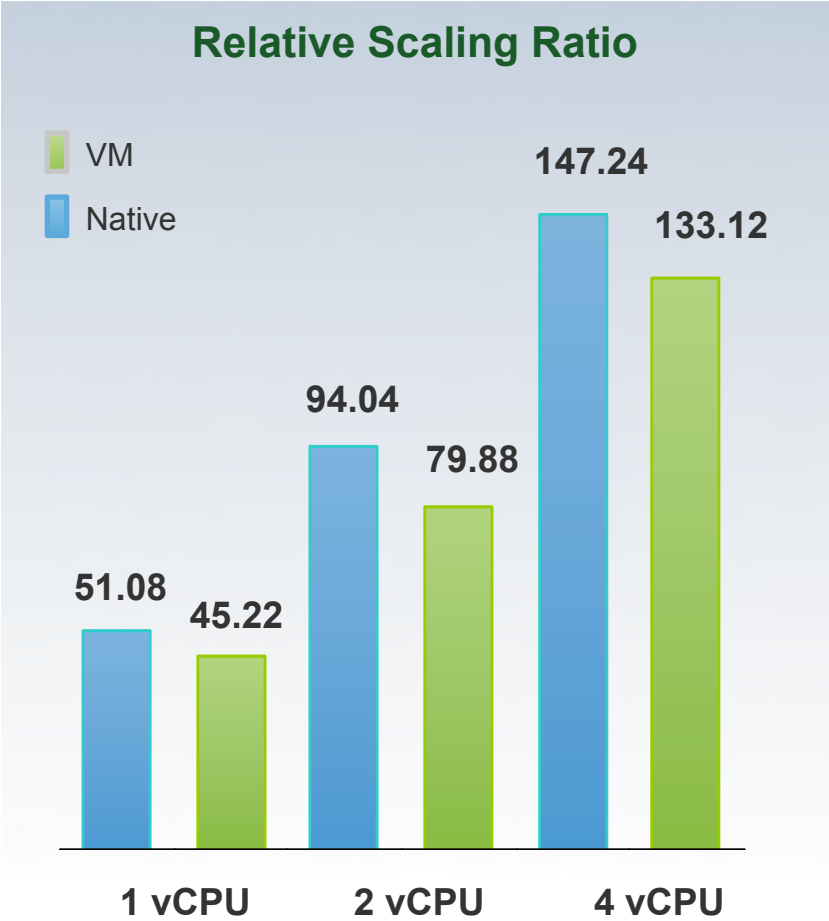
ESX 4.0 Performance with SQL Server 2008



- ESX achieves 90% of native performance on 4.0 vCPU VM
- Workload transaction latency unchanged between ESX 4.0 and Native

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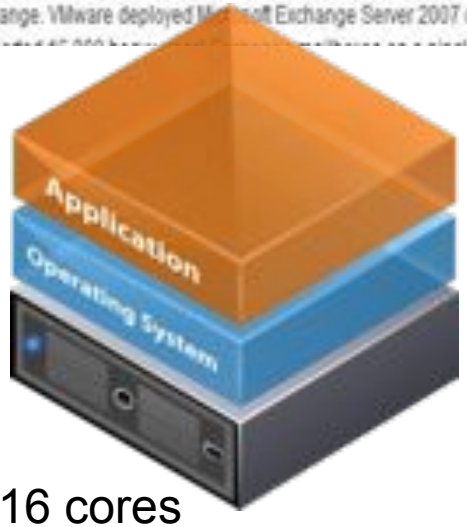
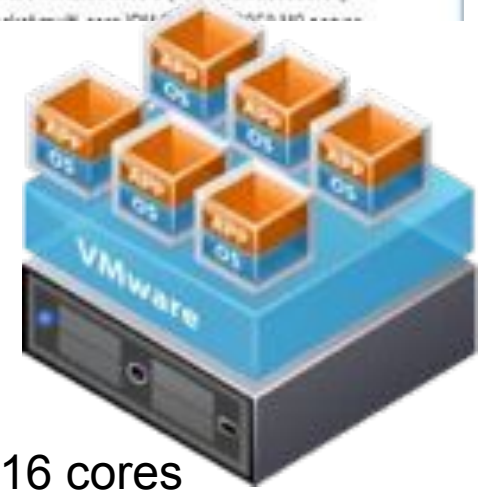
Double Capacity of Exchange 2007 Hosts

Home » About Us » News & Awards » News Releases
VMware Sets Capacity Record Running Microsoft Exchange
Microsoft Exchange Virtualized by VMware More than Doubles Native Capacity of Mailboxes Running on 16-core Physical Servers
CANNES, France, February 26, 2008 — VMware, Inc. (NYSE: VMW), the global leader in virtualization solutions from the desktop to the datacenter, has set a record in system capacity and resource utilization for running Microsoft Exchange. VMware deployed

8,000 Mailboxes



16 cores



16 cores

16,000 Mailboxes

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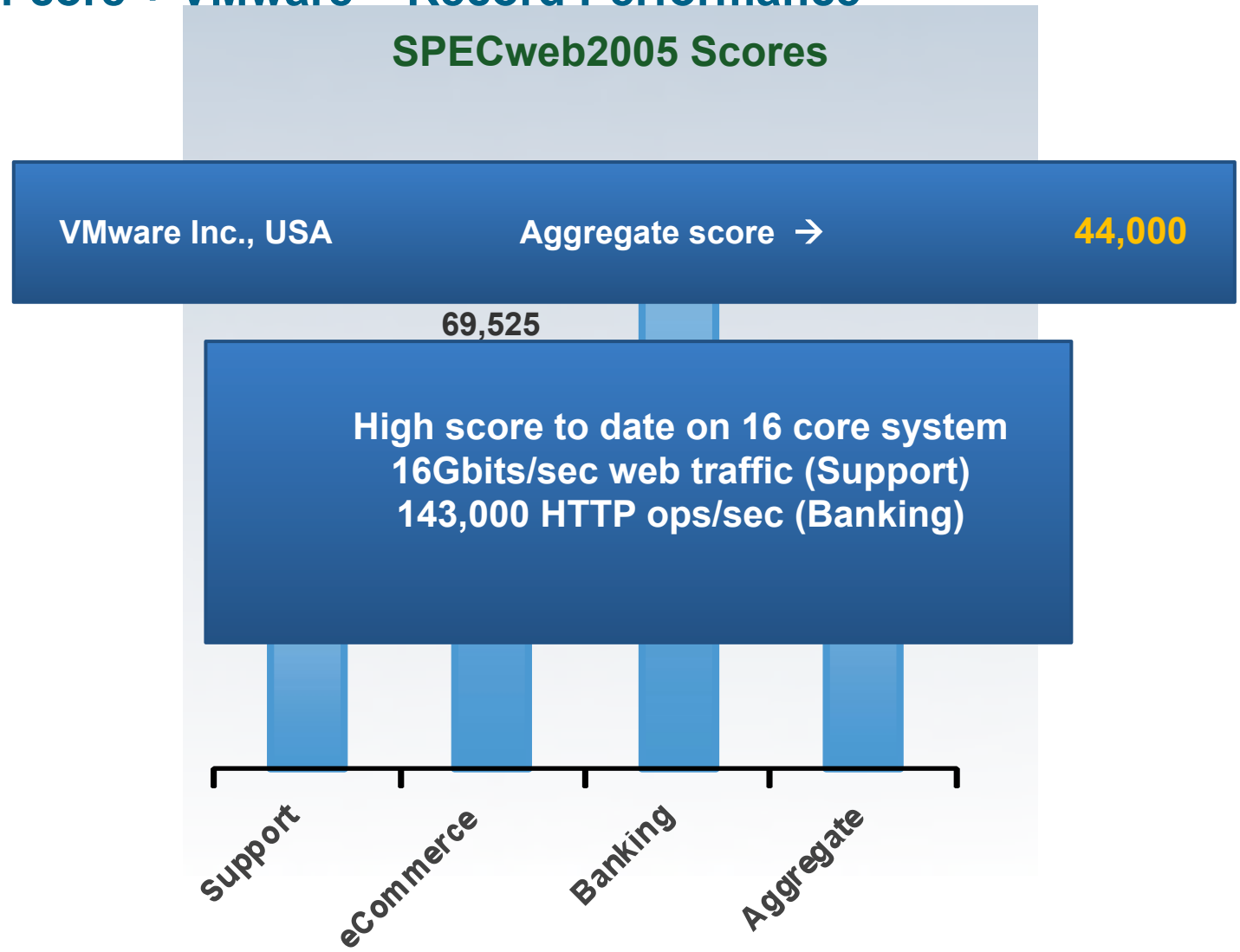
Multi-core + VMware = Record Performance



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Comparison to VISA

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Multi-Core + VMware = Record Performance

3x

eBay's daily web traffic on a single server

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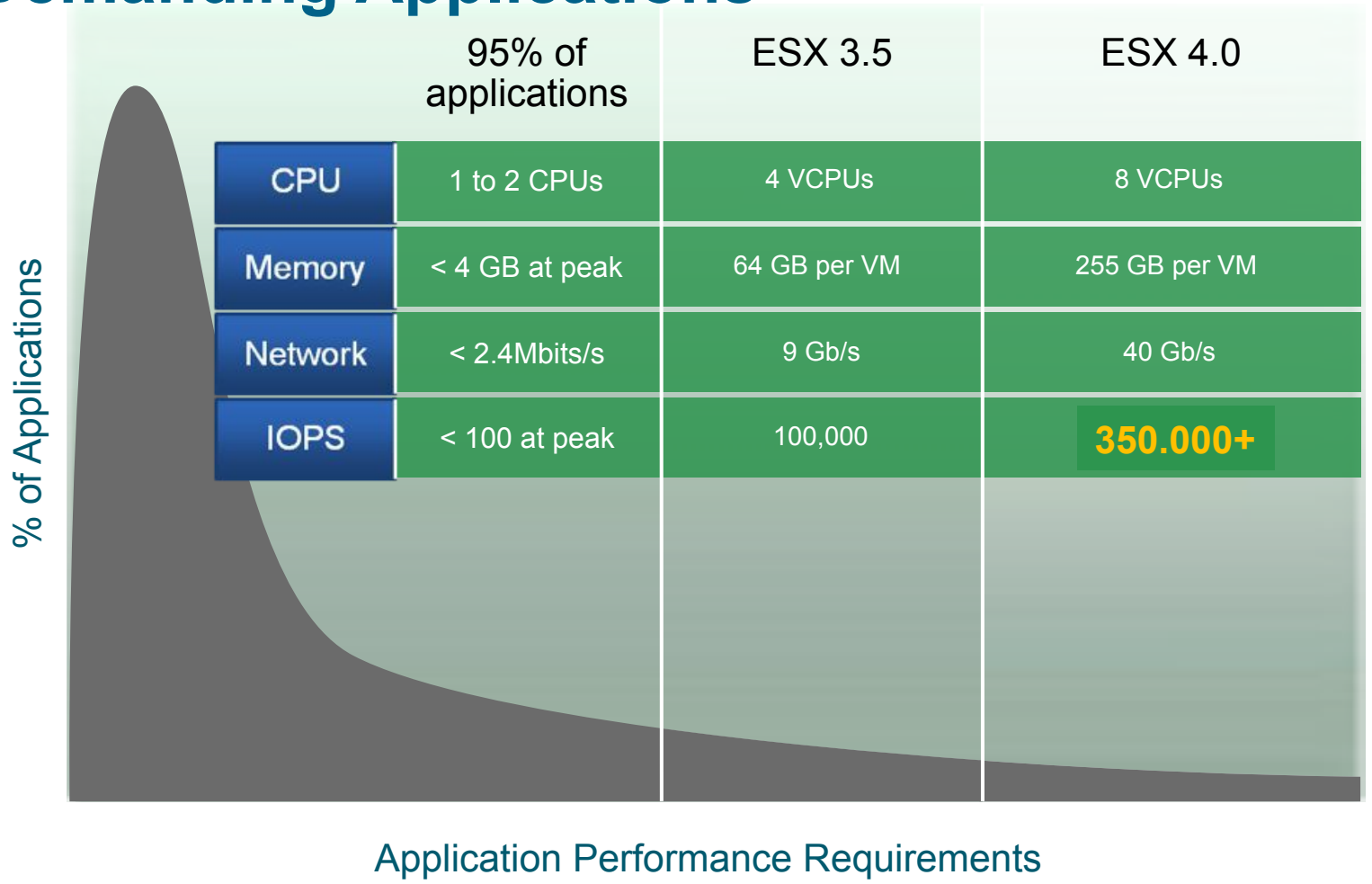
vSphere 4 Delivers Performance for Demanding Applications



1. Source: VMware Capacity Planner assessments

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Key VMware vSphere Features

- VMotion
  - Live migration of VMs from one host to another with zero downtime
  - Used by other vSphere Features
    - Fault Tolerance
    - Storage VMotion
    - DRS and DPM

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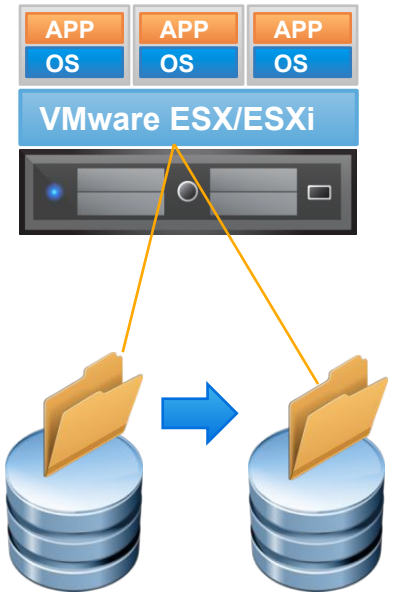
Key VMware vSphere Features

- Storage VMotion
  - Relocate running VM from one datastore to another datastore with zero downtime
  - Relocate across different storage types
  - Change VM disk format (thick or thin)



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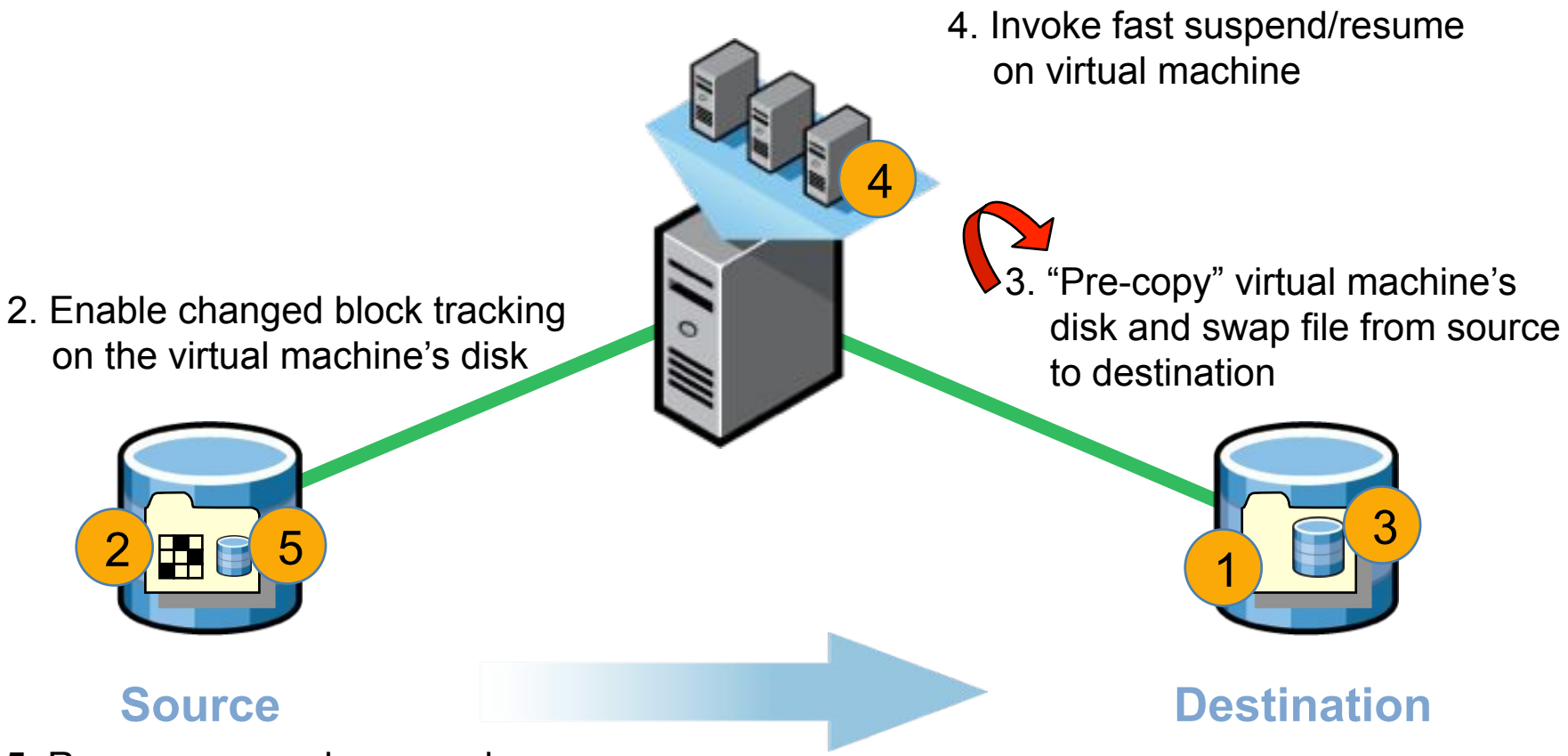
Storage VMotion in vSphere 4


4. Invoke fast suspend/resume on virtual machine
4
3. "Pre-copy" virtual machine's disk and swap file from source to destination
2. Enable changed block tracking on the virtual machine's disk
2
5
1
3
Source
Destination
5. Remove source home and disks of virtual machine
1. Copy virtual machine files except disks to new datastore

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Key VMware vSphere Features

- High Availability (HA)
  - Protects VMs and automatically restarts VMs in the event of
    - Host failure
    - VM failure (loss of heartbeat)

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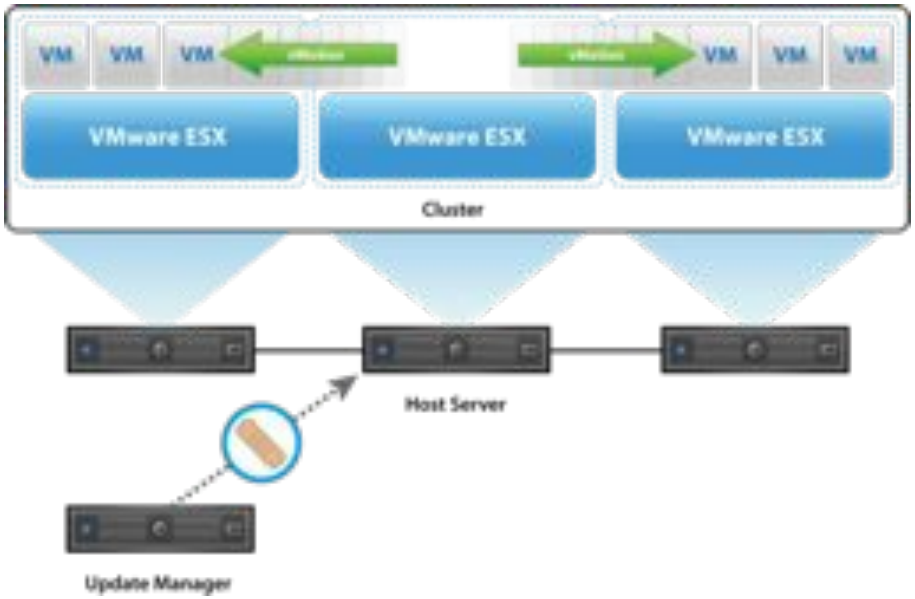
Key VMware vSphere Features

- Update Manager
  - Patch and version management
    - Hosts
    - VMs
  - Baseline and remediation
  - Upgrade



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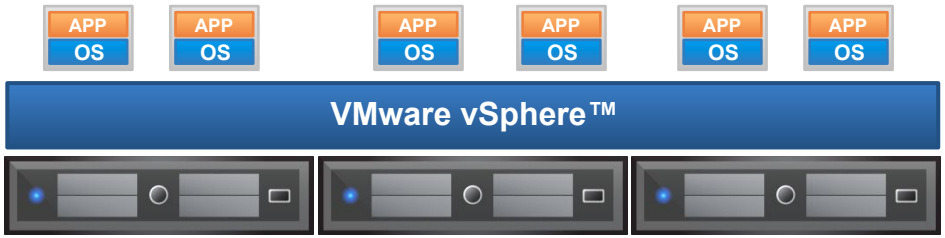
DRS Ensures Capacity on Demand



- Shrink and grow of applications based on demand and priority
- Dynamic and responsive load balancing

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DRS Ensures Capacity on Demand

- Dynamic Load Balancing of the new infrastructure

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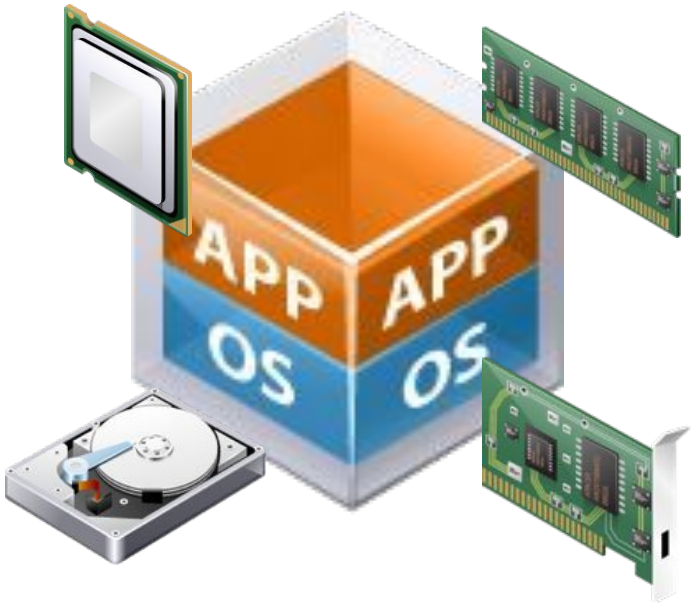
Key VMware vSphere Features

- Hot Add Virtual Devices
  - Hot add
    - CPU
    - Memory
  - Hot add or remove
    - Storage devices
    - Network devices



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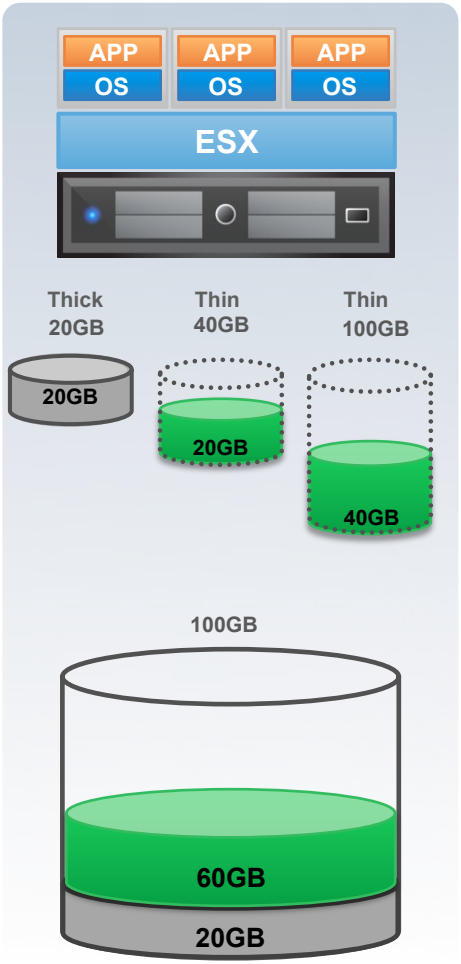
vStorage Thin Provisioning



- Virtual machine disks consume only the amount of physical space in use
  - Virtual machine sees full logical disk size at all times
  - Full reporting and alerting on allocation and consumption
- Significantly improve storage utilization
- Eliminate need to over-provision virtual disks
- Reduce storage costs by up to 50%

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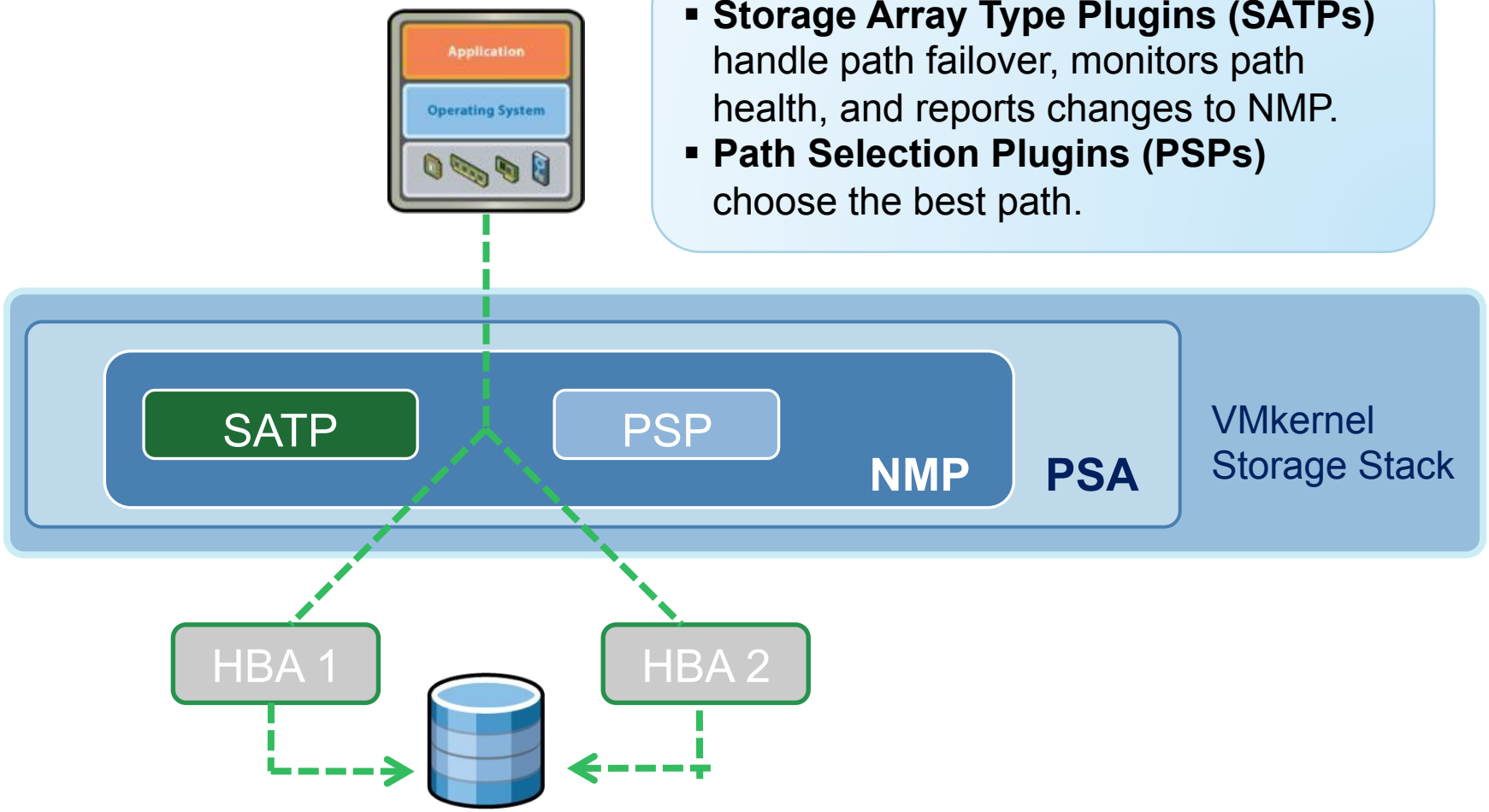
Enhanced Multipathing with Pluggable Storage Architecture (PSA)

- **Storage Array Type Plugins (SATPs)** handle path failover, monitors path health, and reports changes to NMP.
- **Path Selection Plugins (PSPs)** choose the best path.



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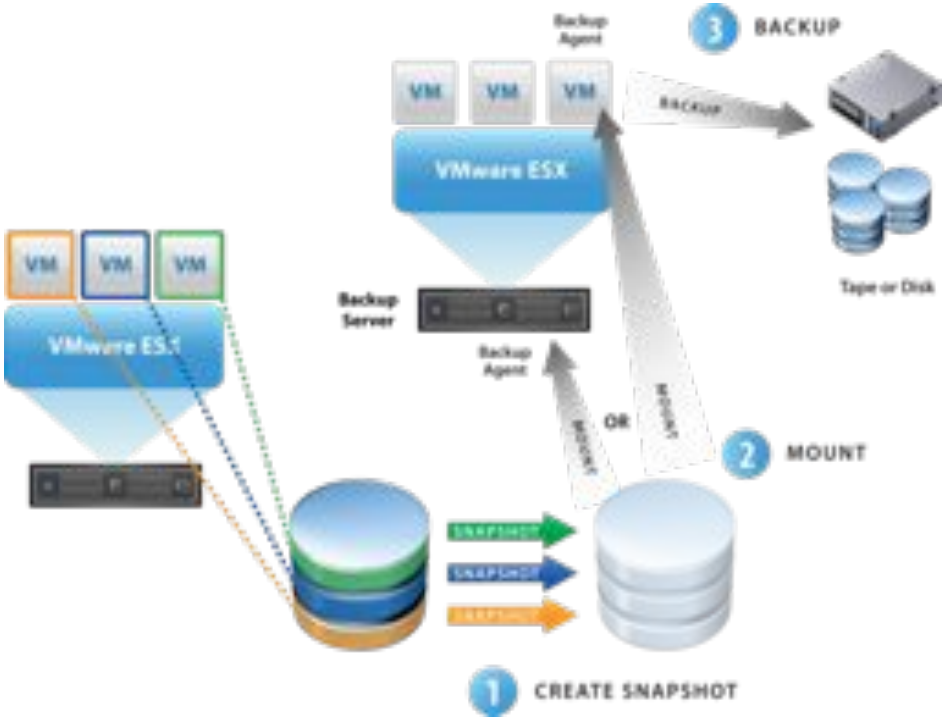
vStorage APIs for Data Protection



- Next generation evolution of VMware Consolidated Backup
  - Centralized off-host backup of virtual machines
  - No additional software on backup server
- Enables incremental, differential, and full-image backup and restore of virtual machines
- File-level backup support for Windows and Linux virtual machines
- Delivers efficient backup without loading ESX servers

** Note: vSphere 4.0 includes and supports VCB 1.5 U1. New features are only available with products supporting vStorage APIs for Data Protection*

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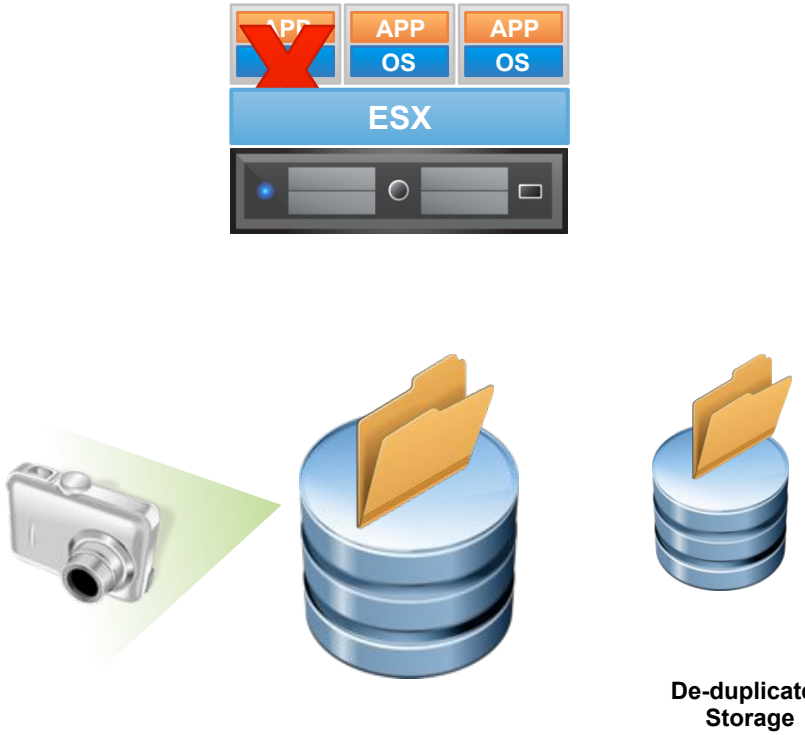
VMware Data Recovery



- Agent-less, disk-based backup and recovery of your VMs
- VM or file level restore
- Incremental backups and data de-dupe to save disk space
- Quick, simple and complete data protection for your VMs
- Centralized Management through vSphere Client
- Cost Effective Storage Management

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vNetwork Distributed Switch

- Aggregated datacenter level virtual networking
- Simplified setup and change
- Easy troubleshooting, monitoring and debugging
- Enables transparent third party management of virtual environments

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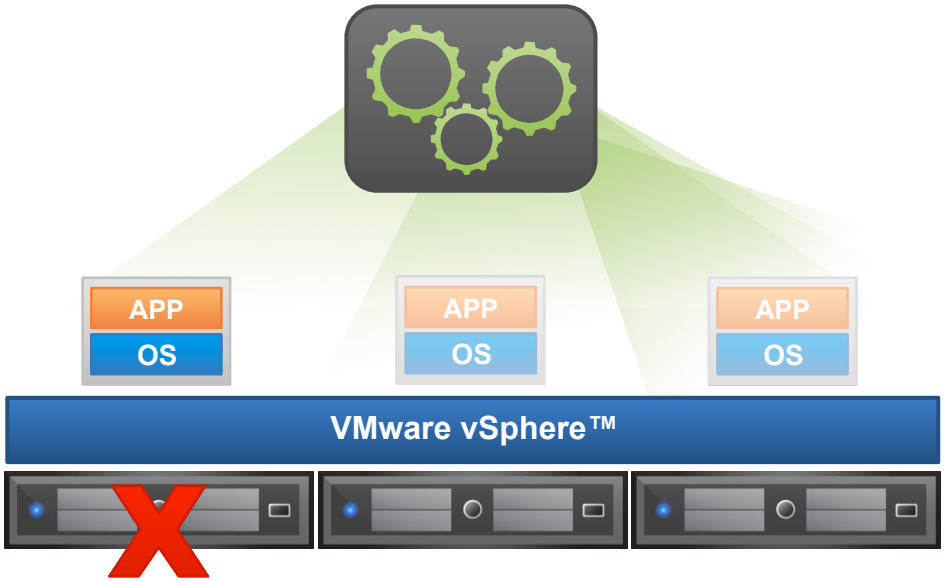
VMware Fault Tolerance



- Single identical VMs running in lockstep on separate hosts
- Zero downtime, zero data loss
- Failover for all virtual machines in case of hardware failures
- No complex clustering or specialized hardware required
- Single common mechanism for all applications and OS-es

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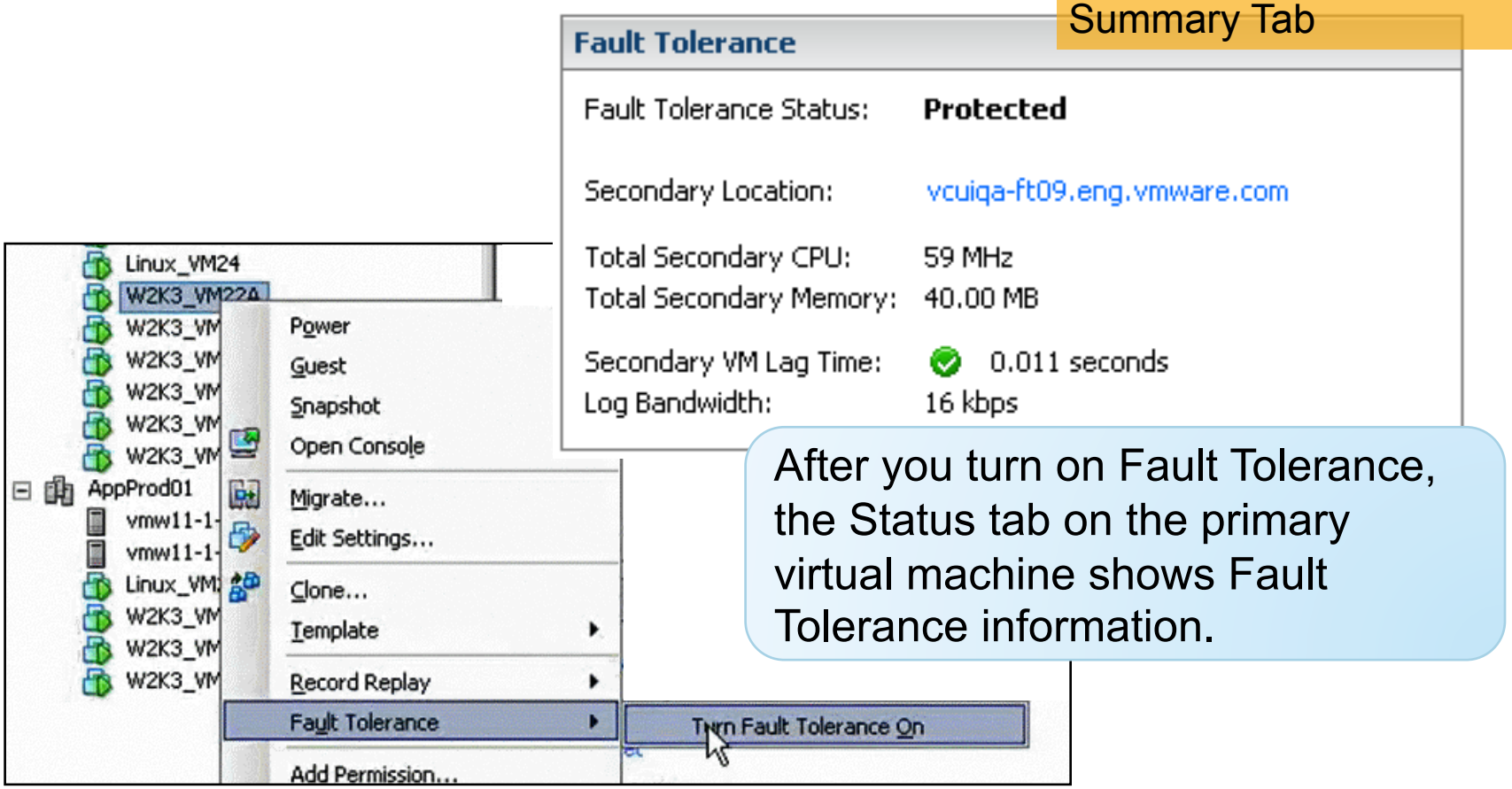
Enable Fault Tolerance with a Single Click

Primary Virtual Machine > Summary Tab



After you turn on Fault Tolerance, the Status tab on the primary virtual machine shows Fault Tolerance information.

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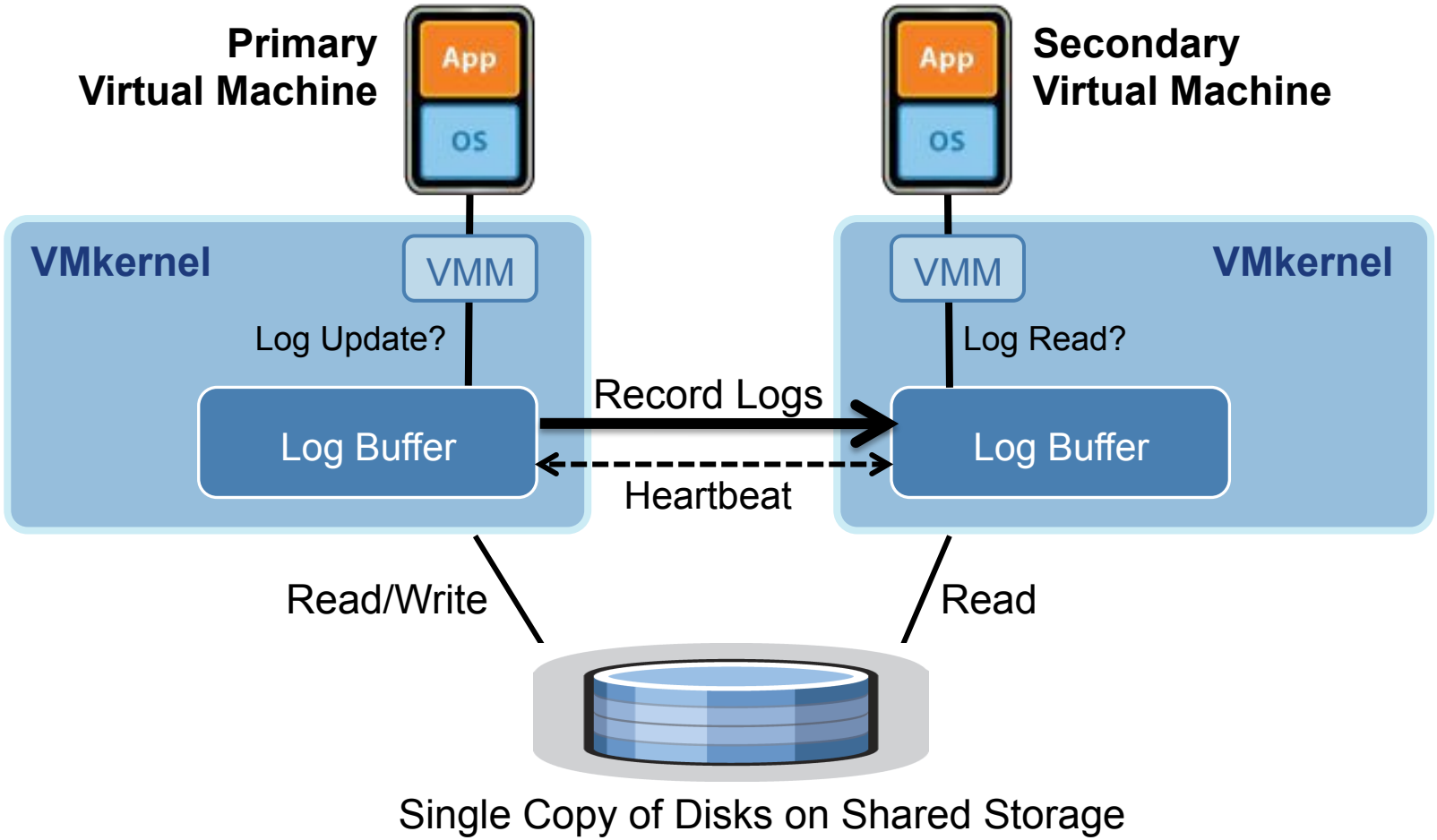
How VMware FT Works



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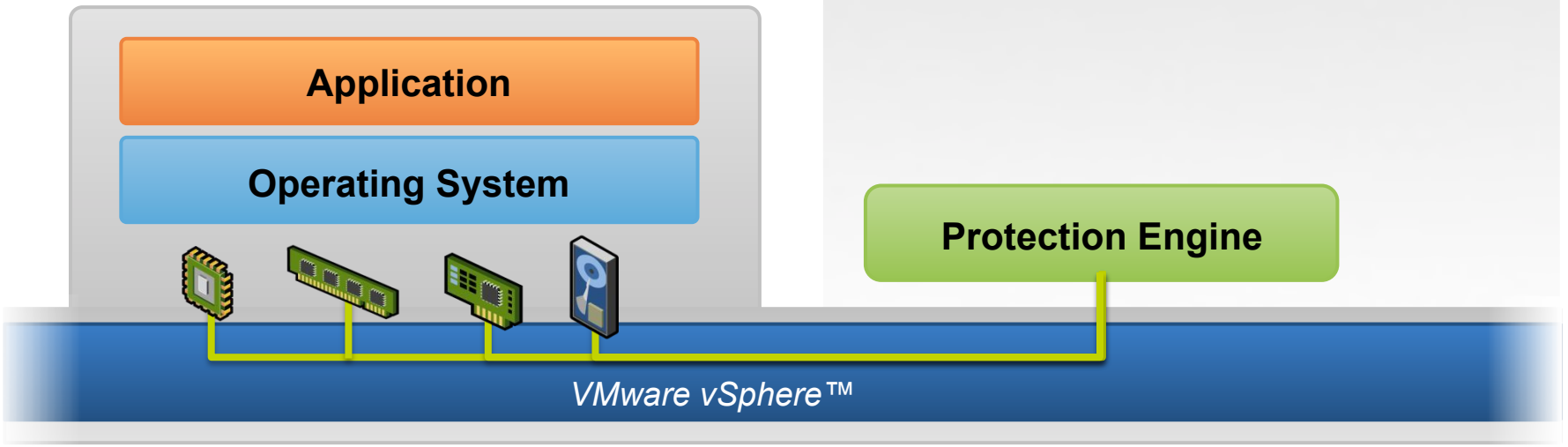
VMware VMsafe

- API that enables protection of VMs by inspection of virtual components in conjunction with hypervisor
- Isolation of protection engine from malware
- Broad ranging coverage of virtual machine CPU, memory, storage and network



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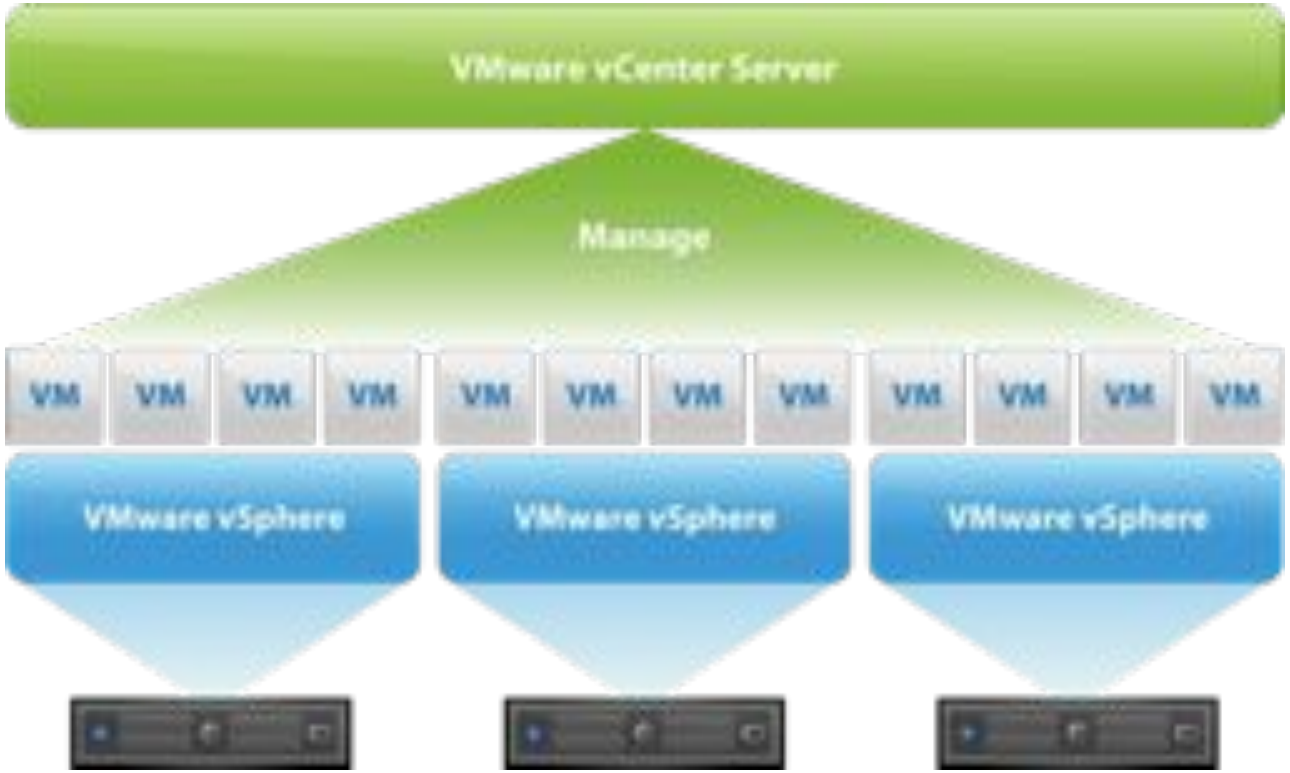
VMware vCenter Server



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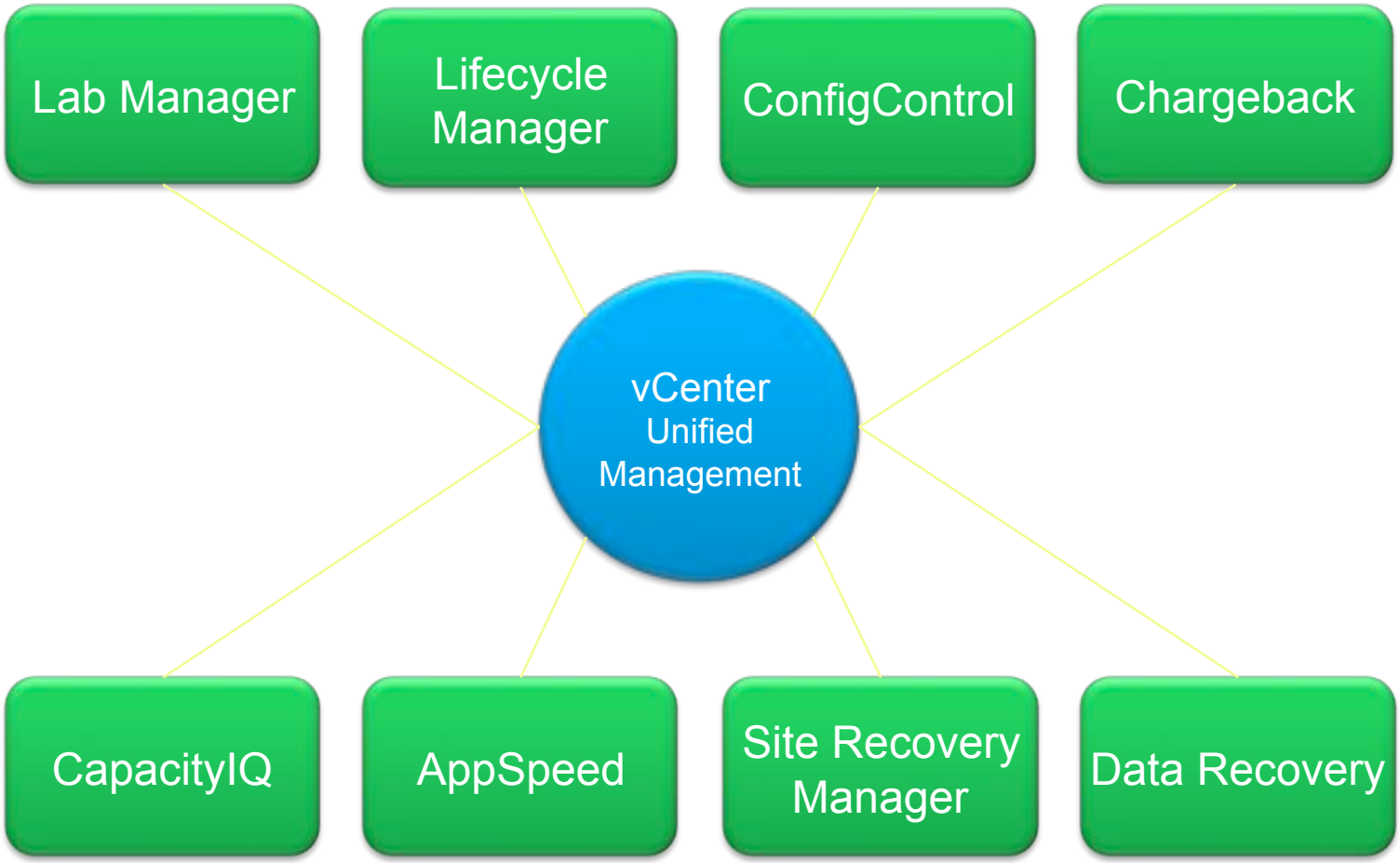
The Universal Hub for Virtualization Management



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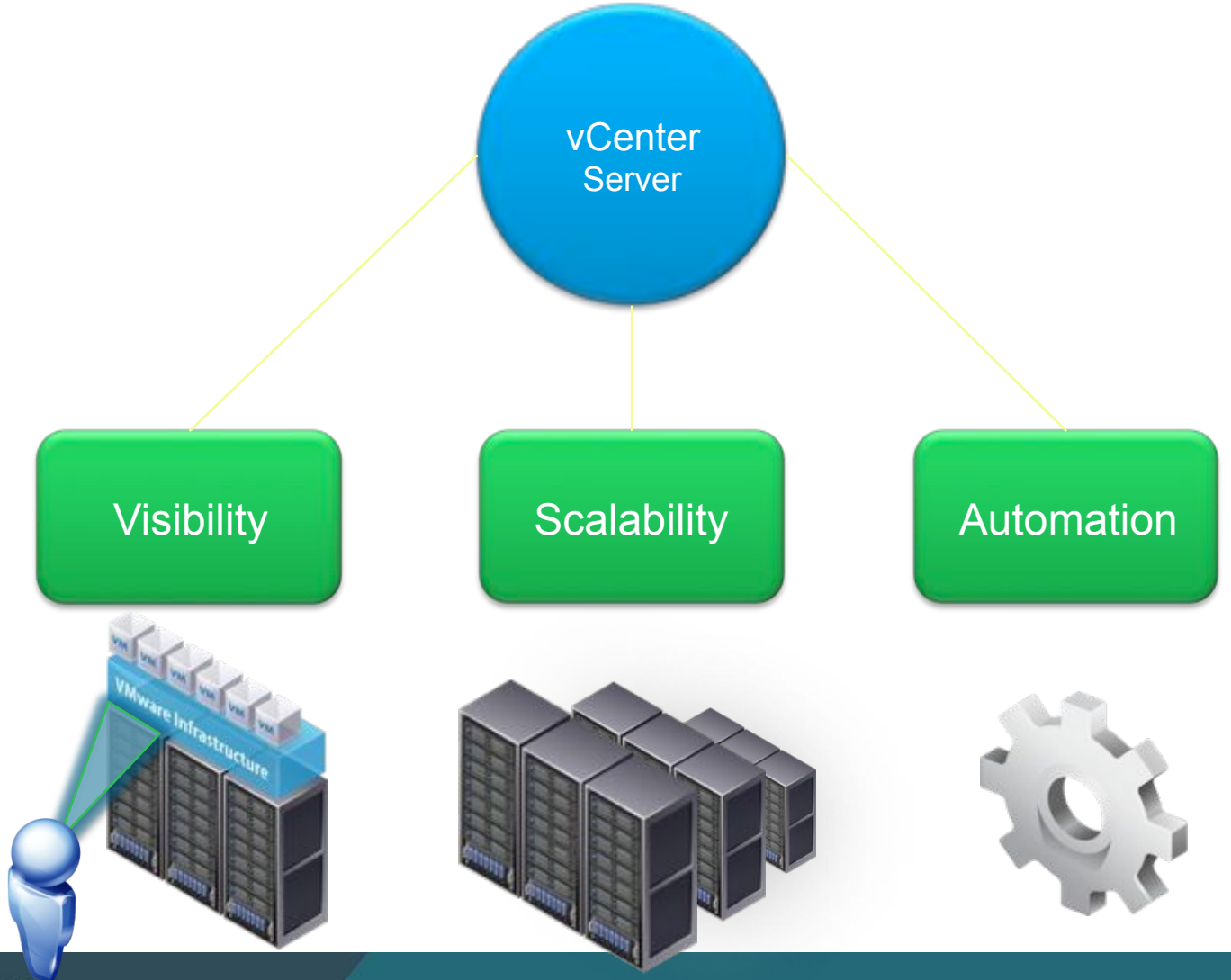
vCenter Server: A Key Infrastructure Component



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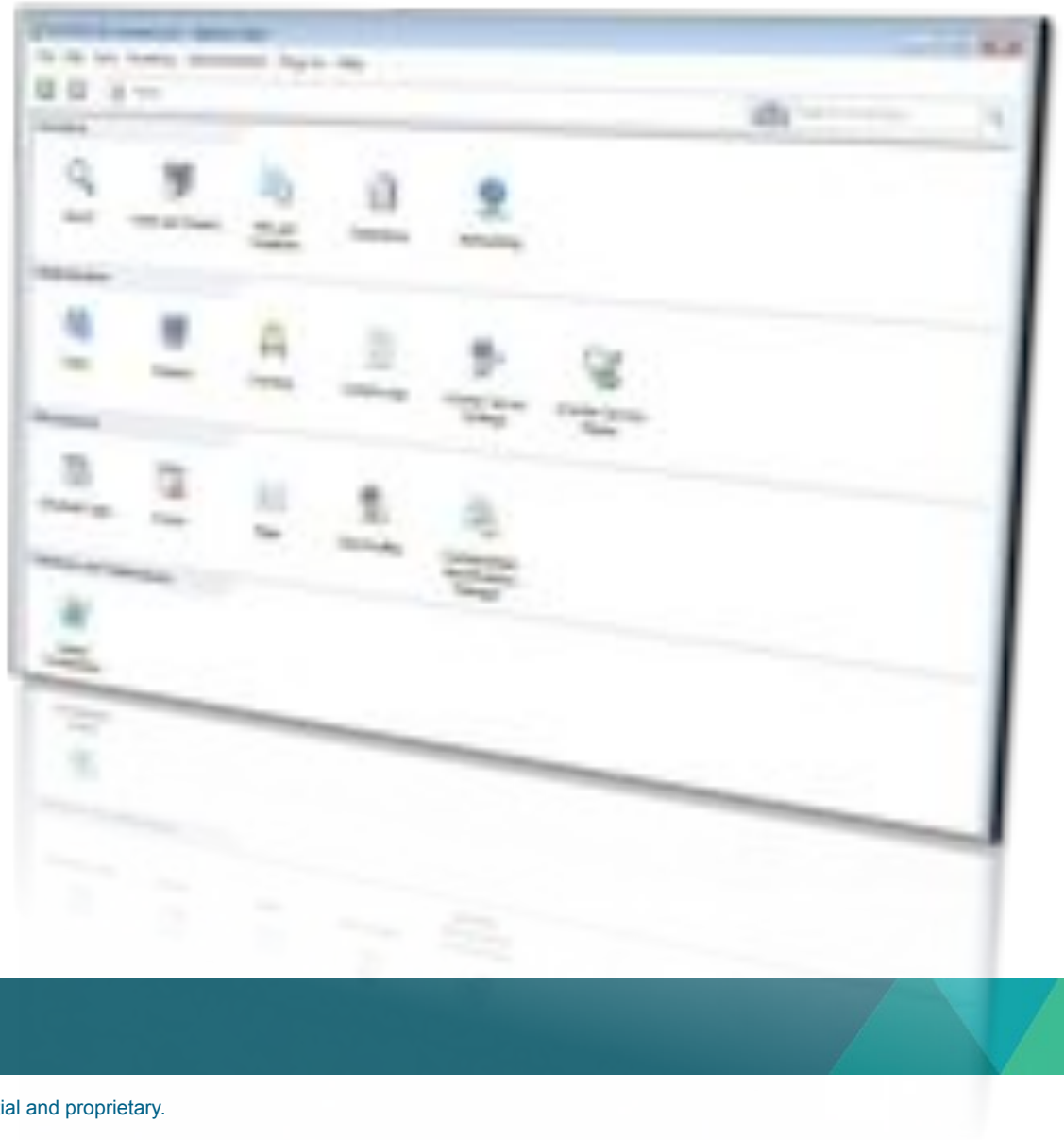
Visibility - VMware vSphere Client



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Visibility - Overview Performance Charts

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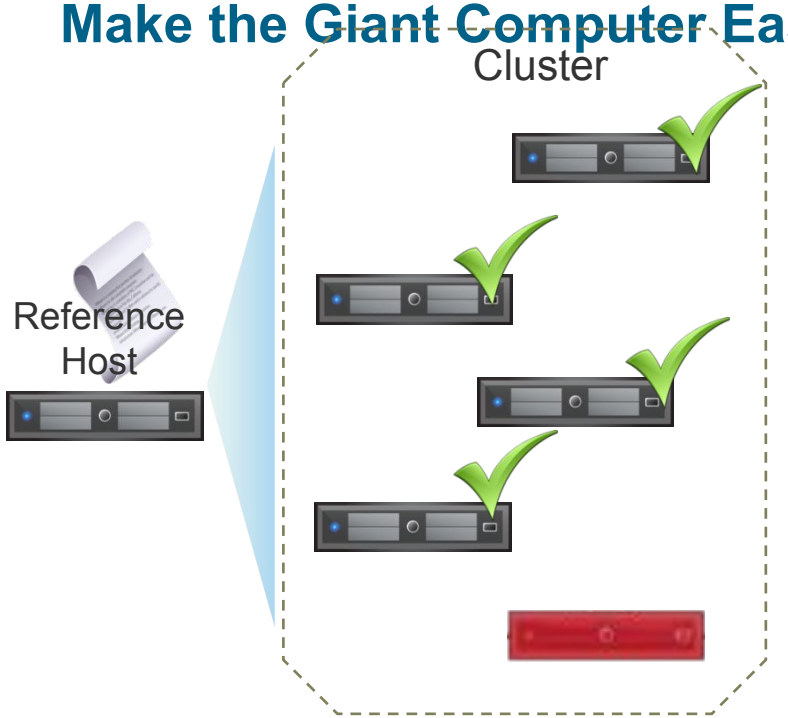
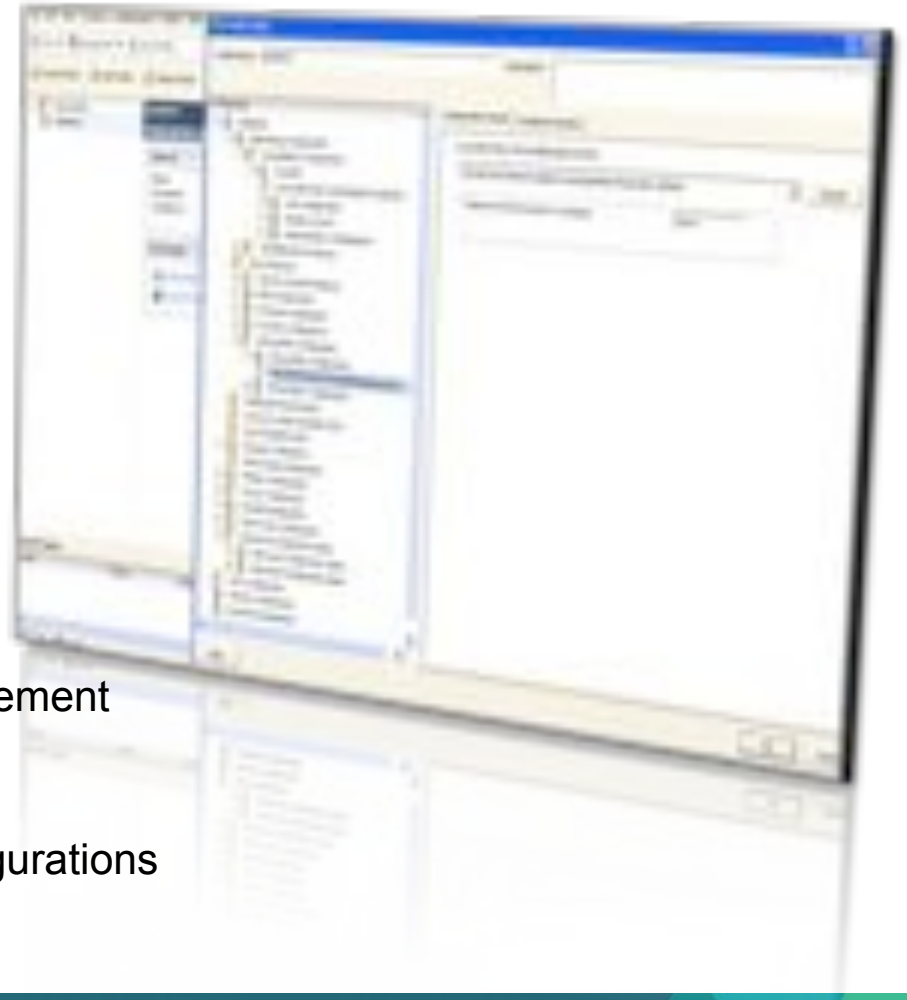
Scalability - vCenter Host Profile:

Make the Giant Computer Easy to Extend/Scale





- Simplified setup and change management for ESX hosts
- Easy detection of non-compliance with standard configurations
- Automated remediation

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vCenter Update Manager

Central & actionable
Patch compliance
dashboard

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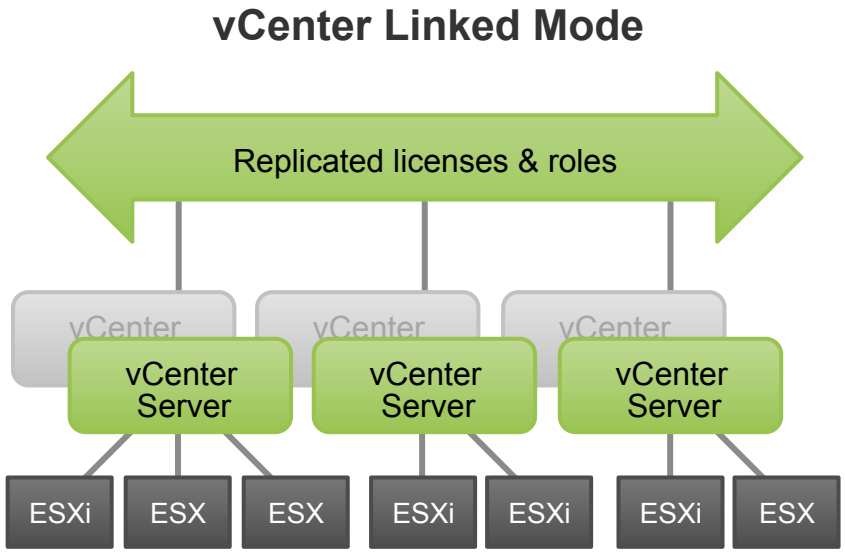
Scalability -vCenter Server – Linked Mode



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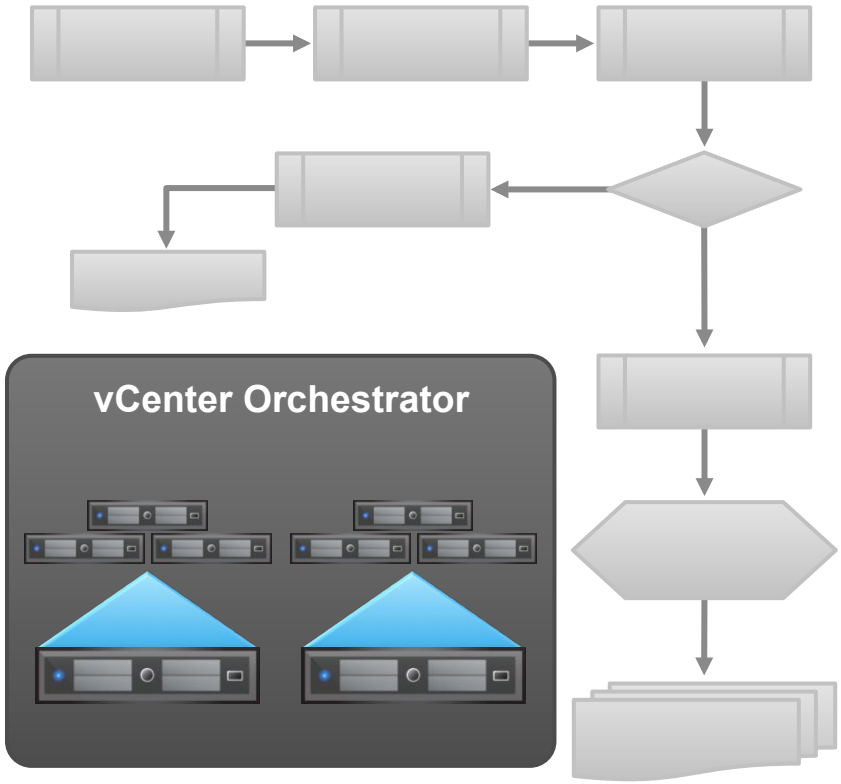
Automation - vCenter Orchestrator



- Workflow engine for orchestrating virtualization
- Automate manual, repeatable steps by drag and drop interface without scripting
- Centralize workflow management for all processes associated with the environment
- Administer and control large environments easily
- Provide custom workflows for complex environments

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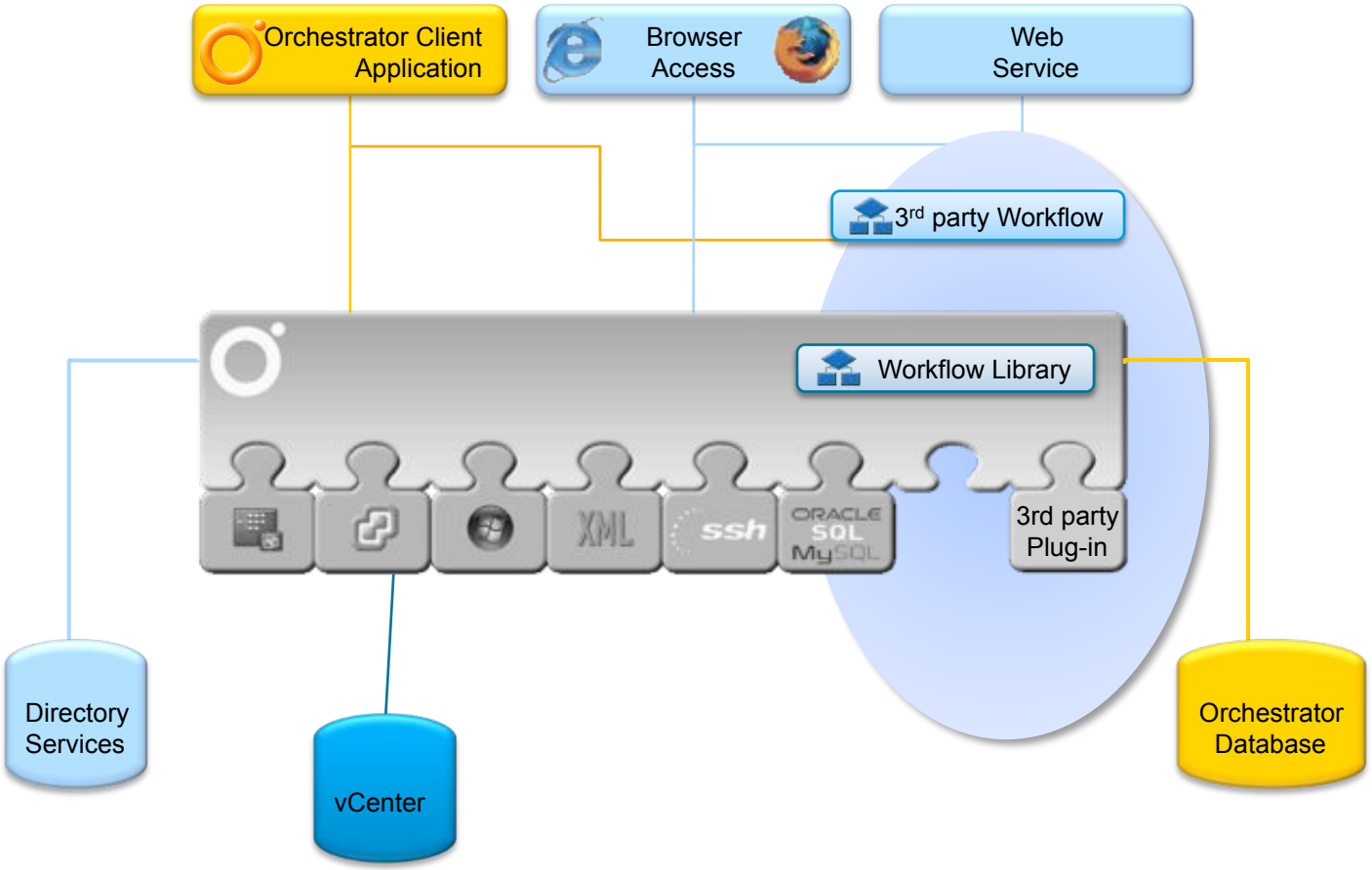
Orchestrator is extensible:
Open Java API for plug-in development



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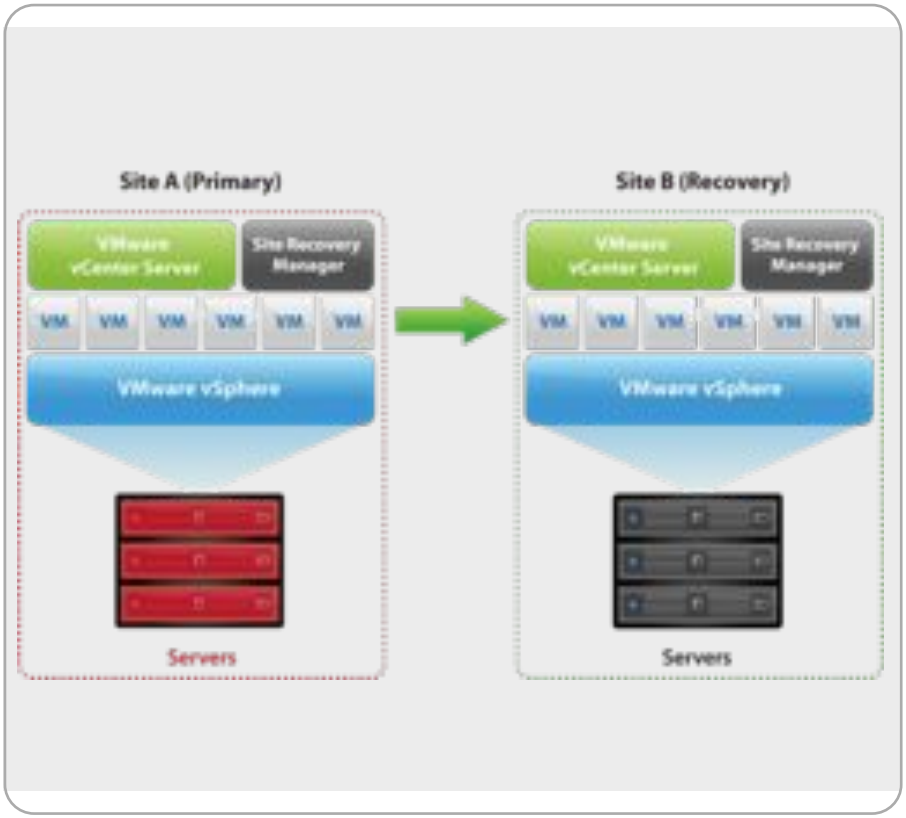
VMware vCenter Site Recovery Manager

Site Recovery Manager leverages VMware vSphere to deliver advanced disaster recovery management and automation



- **Simplifies and automates disaster recovery workflows:**
  - Setup, testing, failover
- **Turns manual recovery runbooks into automated recovery plans**
- **Provides central management of recovery plans from the VMware vSphere Client**

Works with VMware vSphere to make disaster recovery rapid, reliable, manageable, affordable

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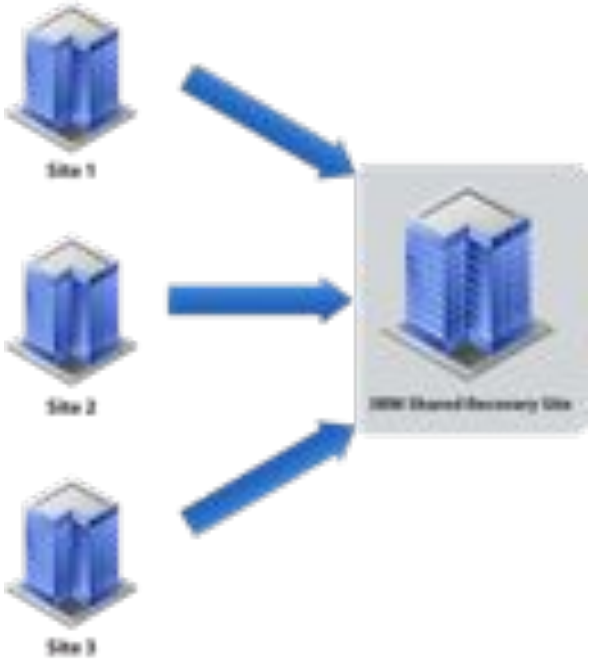
Deployment Topologies

Standard Deployment:

- 1:1 mapping between each protected site and its recovery site

Shared Recovery Sites:

- Multiple sites can be protected by a single, shared recovery site
- Leverage for remote office/branch office topologies



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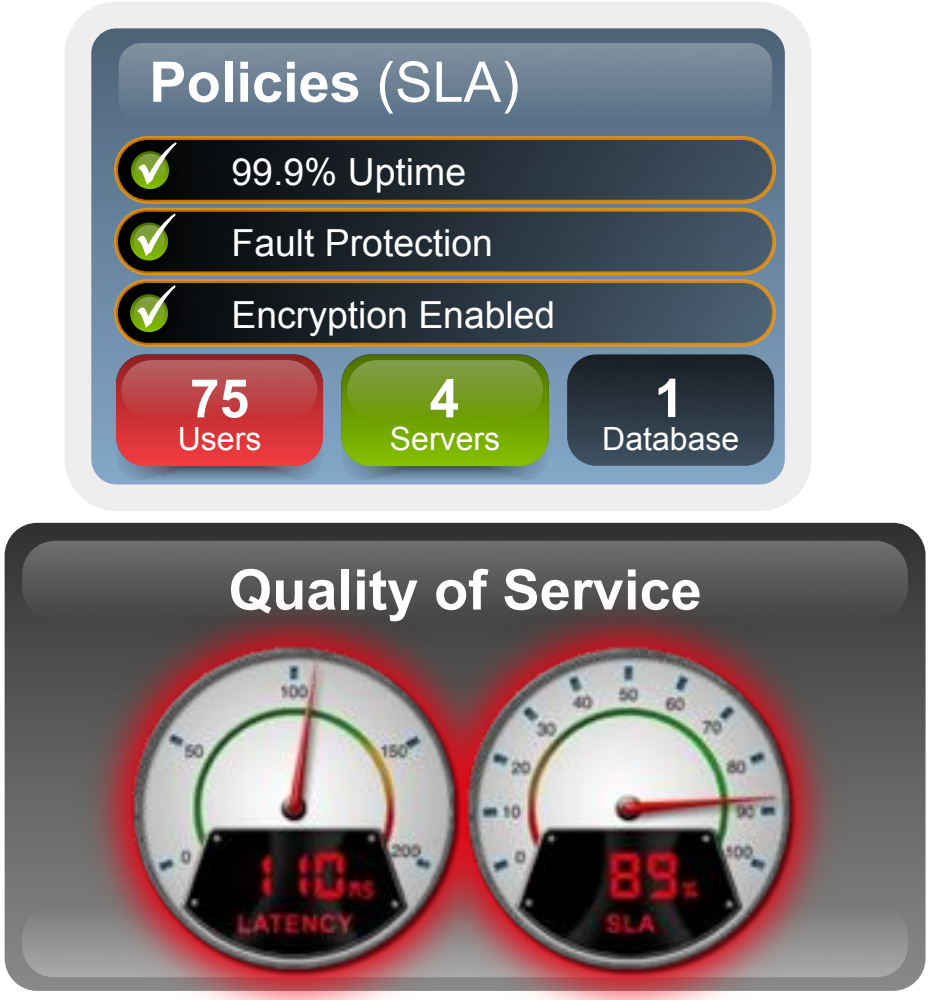
Monitor and Control QoS: VMware vCenter AppSpeed



- Monitor application performance from end-user perspective
- Collect and correlate across tiers and in VI
- Automated SLA management

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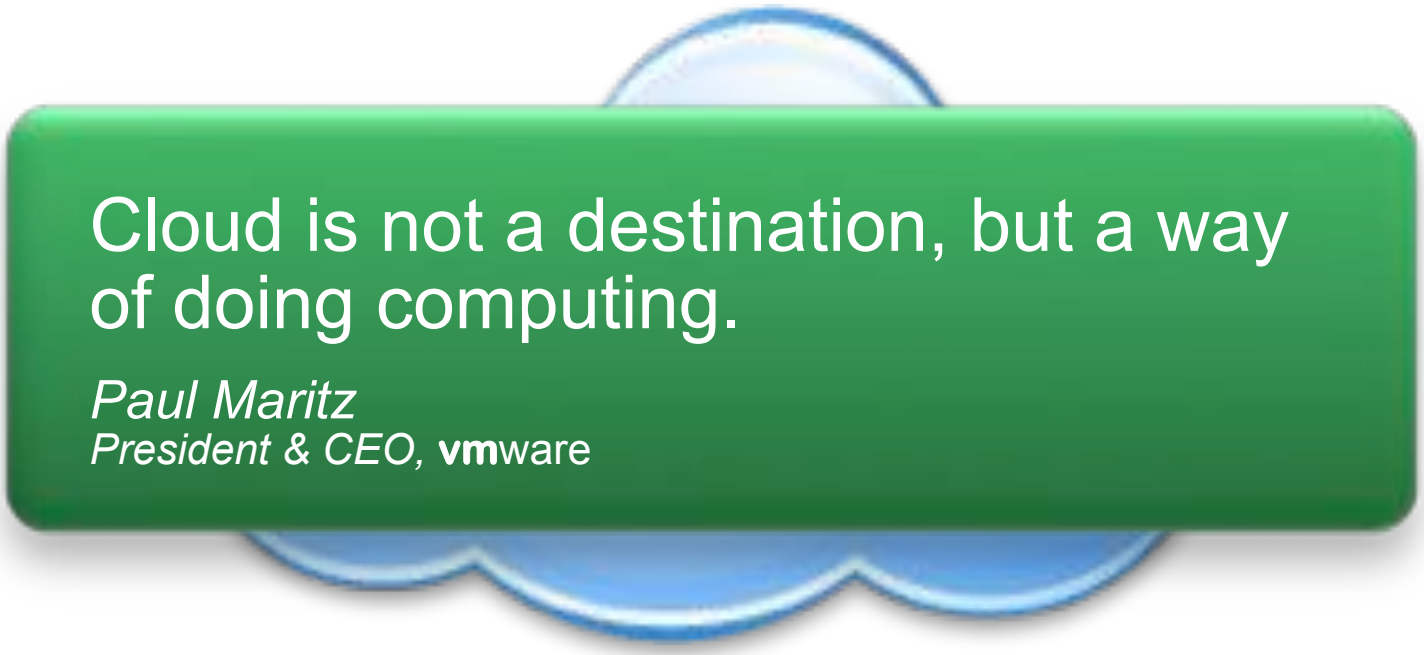
Defining the Cloud



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Virtualize – *Simplify the Datacenter*

The Datacenter

- ✓ Virtualize everything – **Servers, Storage, Network**
- ✓ Free apps from infrastructure
- ✓ Dynamic optimization of resources

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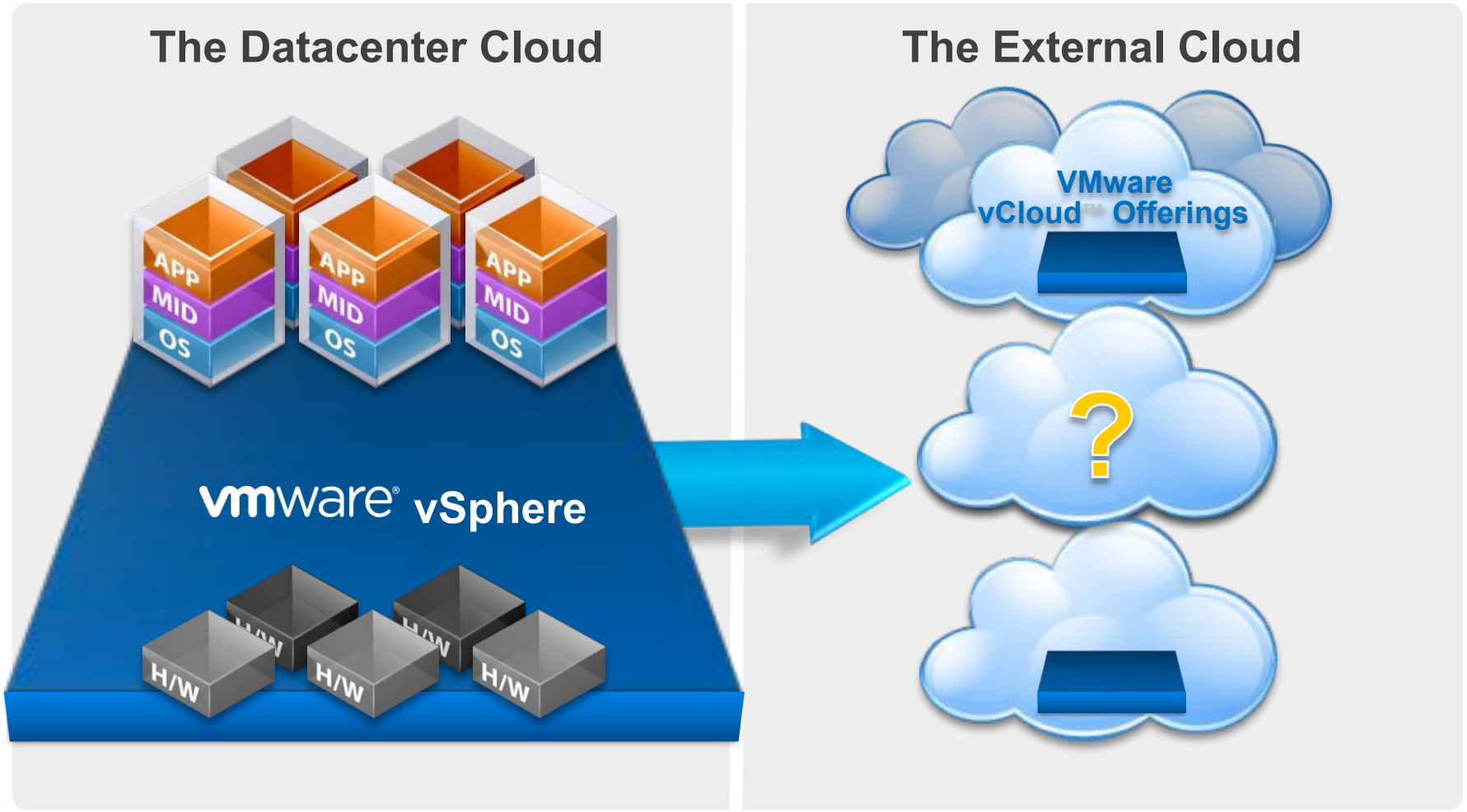
Extend – *The Private Cloud to the External Cloud*



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vApp – Self Describing Applications Enable Automated SLA Management

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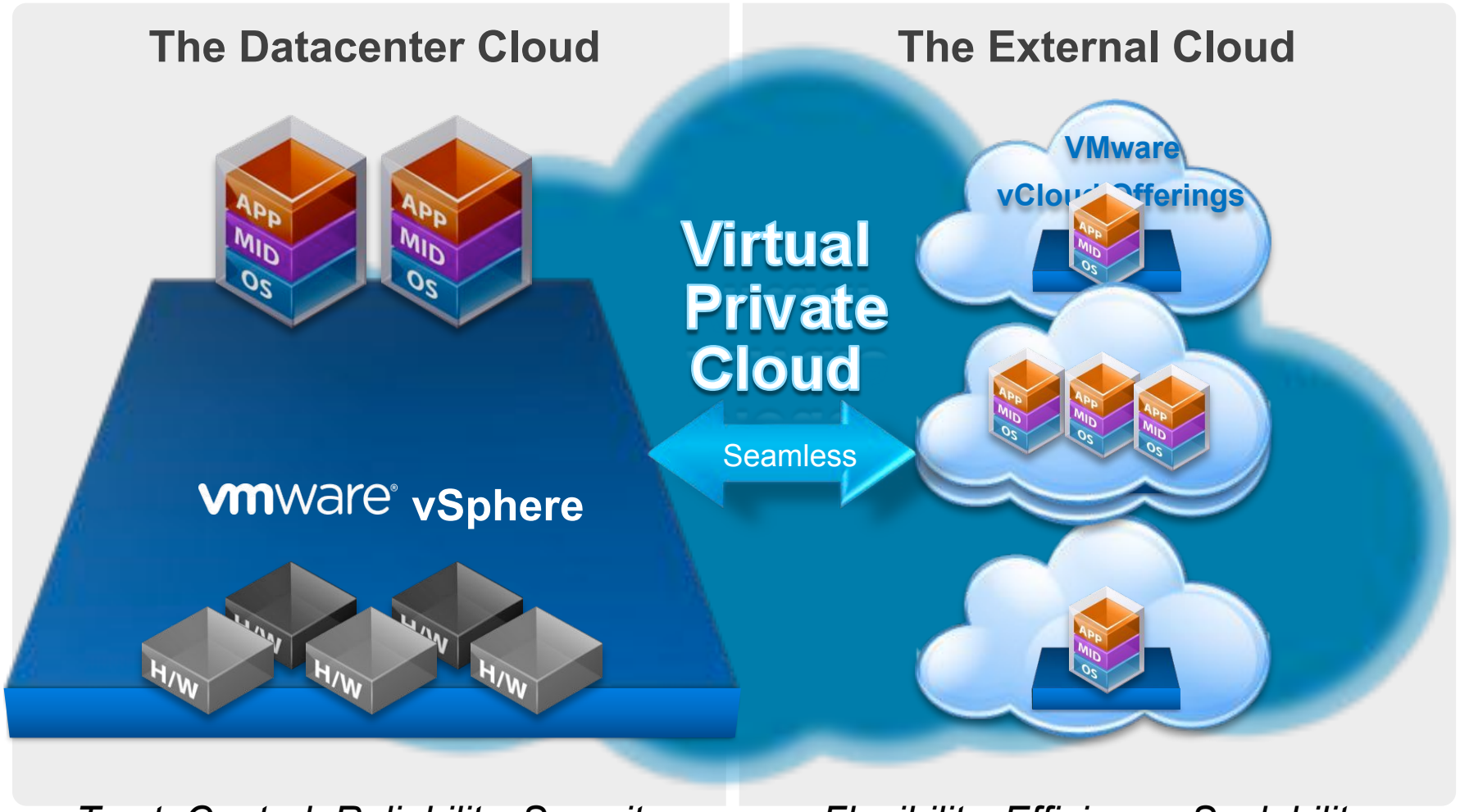
Extend – *The Private Cloud to the External Cloud*



Trust, Control, Reliability, Security

Flexibility, Efficiency, Scalability

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Questions and Answers